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BIRD-BANDING

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NESTING OF THE HORNED LARK ON BAFFIN ISLAND

By George M. Sutton and David F. Parmelee

During our sojourn in southern Baffin Island from June 14 to August 22, 1953, we recorded the Horned Lark *(Eremophila alpestris)* almost daily. In the immediate vicinity of the United States Air Force Base, near the head of Frobisher Bay, it was less common than the Snow Bunting *(Plectrophenax nivalis)* and Lapland Longspur *(Calcarius lapponicus)*, about as common as the Water-Pipit *(Anthus spinoletta)*, and decidedly more common than the Wheatear *(Oenanthe oenanthe)*. A low, moist, thinly grassed flat just above high-tide mark and near the Base's dump was a favorite gathering place for larks all summer. At least one pair nested there, or close by, and larks which nested some distance away went there with their broods. We never walked through this area without hearing and seeing several larks. On higher, drier, more gravelly flats just north of the Base, several pairs nested. Both of these habitats the larks shared with the only common shorebird of the neighborhood, the Semipalmated Plover *(Charadrius semipalmatus)*. Larks, plovers, buntings and longspurs were familiar dooryard birds: we were apt to see any or all of them whenever we stepped out of the building in which we lived.

In the monotonous "desert tundra" of the high interior north and northeast of the Base, the Horned Lark was uncommon. We covered, fairly regularly and often, an 18-square-mile stretch of these rocky barrens, finding them to be disappointingly devoid of birdlife. Among passeriform birds, the Snow Bunting was the species we were most apt to see there. Often the only bird in sight was a Snowy Owl *(Nyctea scandiaca)* perched on a distant hilltop or flying with measured wingbeats, like a great white gull, across a wind-rippled lake. In this all but soundless country the larks had a way of springing swiftly from the ground with a startling *ee-dip*, *ee-zip*, or *ee-zee-dip*. Soper (1940: 16) mentions the Horned Lark among the species "most likely to be encountered" in these bird-poor areas of the arctic.

We saw or heard Horned Larks at all elevations, from the very edge of the salt water to the highest knobs of the interior. Wherever the land was flat or gently sloping, free of boulders, well drained, and sparsely covered with lichens, moss, and thin, short grasses, larks were likely to be. Several pairs nested on wide, sprawling gravel mounds along the east bank of the Sylvia Grinnell River about a mile upstream from its mouth, and in drier parts of the Davidson Point lowlands. We failed to record the species on islands in Frobisher Bay—not even on big, bluff Hill Island, directly southwest of the Base. At the mouth of the Jordan River, 16 miles west of the Base, we saw a few Horned Larks on July 13 and from July 17 to 20. We saw a family group of larks, and found an empty nest, near a large unnamed lake about 50 miles east-northeast of Wordie Bay at Lat. 68° 31′ N., Long. 71° 22′

W., along Baffin Island's west coast, on August 8. At Lat. 65° 20′ N., Long. 77° 10′ W., near Cape Dorchester, we saw several larks on August 11. Along the southeastern shores of Lake Amadjuak (Lat. 64° 38′ N., Long. 70° 28′ W.) we saw several larks on August 15.

We mention these several localities since not so very long ago *Eremophila alpestris* was thought to be rare on Baffin Island. Kumlien (1879) did not even list the species from Cumberland Sound. From Oberholser's (1902) map showing the over-all distribution of *Otocoris* [=*Eremophila*], one would suppose that only a small part of extreme southwestern Baffin Island was inhabited by the genus at the turn of the century. According to Soper (1928:109), the first breeding record for the island was that of Hantzsch, who obtained two eggs from Eskimos on the Kekerton Islands, in Cumberland Sound, in 1909. As recently as 1946, Soper (1946:419) considered the lark "one of the scarcest of small land birds." Wynne-Edwards (1952:376) saw no larks at the mouth of Frobisher Bay in July and August, 1937. This alleged "scarcity" of larks may have been, in large part, a scarcity of human observers. In any event, Soper collected a fine series of adult larks in the course of his own exploration of southern parts of Baffin Island from 1928 to 1931 and Wynne-Edwards *(ibid.,* 375) reported on four specimens collected by him at the head of Clyde Inlet.

The day we started our 1953 observations (June 15) the flat lowlands about the Base were dark and bare, but the whole bay was ice-covered and the high interior, from the nearest slopes upward, was half-white with snow. We spent much of our time that day along the bay-shore and on the flats and lower hills just north of the Base. Here we counted about 15 larks, all males. The wind (south-southwest) was fairly strong (maximum velocity 14 mph) and the air decidedly chilly (minimum temperature 28.2° F., maximum 39.1°) despite the brightness of the sun. Some snow fell. We heard lark-song frequently, but saw no bird singing in the air. Singing males usually perched on rocks or mossy hummocks, but some of them sang without seeking the slightest eminence. Occasionally we came upon two males a few inches apart, facing each other with heads lowered and horns lifted conspicuously. After holding such a threatening pose for an instant, each bird walked about with mincing steps, head moving jerkily up and down or from side to side in obvious resentment over the proximity of the other. The excited, almost incessant twittering sometimes worked itself up into perfunctory song. The birds never came to actual blows on the ground. Instead, as a climax to their altercation, they fluttered upward 15 to 20 feet, clawing and biting at each other the whole way. These aerial battles sometimes ended in a chase. Once we saw three larks—all males—chasing each other in a sort of free-for-all. Pickwell (1931:135), describing the courtship behavior of the Prairie Horned Lark *(Eremophila alpestris praticola)*, says: "The males . . . frequently strut before each other and often peck the ground furiously, like barnyard cocks, but all fighting is in the air." Cottrille (1950:134-135) well describes aerial fighting between two male *E. a. praticola* in southern Michigan.

Aware of the statements of Soper (1928:108-109 and 1946:418-419), Sutton (1932:211, 217) and Wynne-Edwards (1952:375-376) concern-

ing Baffin Island's mixed populations of "yellow-faced" and "white-faced" larks, we made a point of studying critically each bird we saw. Of the 15 males above referred to, 14 were fairly bright yellow, one was pale yellow, and not one was even approximately white, on the throat and face. In general they looked like the larks Sutton had observed on the Labrador coast in the summer of 1920. We decided not to collect any specimens until we had discovered at least one or two nests. Notable among our June 15 observations was this: we did not see a female lark anywhere. Actually, as subsequent work proved, most of the larks were paired; many females were on their nests, incubating eggs; and many males were defending territories by mid-June. All this defense of territory was directed, so far as we could see, toward other male larks. They paid not the slightest attention to the several, and clamorous, Semipalmated Plovers which followed us all over the flats; or to the Lapland Longspurs, which seemed to prefer the grassier, slightly more moist, areas.

On June 16 the air temperature rose a little (minimum 30.5°, maximum 41.2°), but the wind continued and we had another light snowfall. That day we observed several larks singing flight-songs above the high country east of the Base, and we saw one female bird (yellow-faced). Bearing in mind the species' reputation for early nesting; remembering also our special interest in two-broodedness, we wondered if any young larks were already out of nests.

On June 17 we found our first nest (Nest 1). It contained four eggs. It was about 400 yards north of the Base in an area which had recently been disturbed by construction work. It was at the edge of a bare patch of gravel and was slightly sheltered to the east by a tussock of foot-high grass. A few bits of dry moss had been placed about it as a sort of pavement. We found it by watching first the male, a yellow-faced individual, then the female, also yellow-faced, which suddenly appeared "out of nowhere," and whose behavior, from the moment we first saw her, was patently broody. The male and female paid little attention to each other, so far as we could tell, and presently the male flew off. The female was restless. Though she went through the motions of hunting for, and finding, food, we were not sure that she actually swallowed anything. Her plumage was fluffed out. Occasionally, after shaking herself, she became sleek, but her feathers soon lifted again. She walked rapidly, pausing occasionally to lift her head and give an anxious chirp. Finally, after much wandering about, she ran swiftly to the nest and settled on it. As we came up, she ran off with wings partly spread, rose in flight when a few yards away, circled quickly, and alighted within about 30 feet. Now her broodiness was more apparent than ever. She chirped occasionally, but the male did not join her. The nest was thick-walled and warmly lined with brown last-year's tassels of bog-cotton *(Eriophorum)*. The eggs were rich, deep, greenish gray in ground-color, and were very heavily spotted.

On June 18, at 5:45 a.m., we found the female sitting closely on her four eggs. We almost touched her before she flew off. At 3:15 p.m. we went to the nest again, finding three young and one egg. At 5:30 p.m. one egg still was unhatched. The nestlings were well covered

above with yellowish buff down. They probably were asleep, for they neither lifted their heads nor opened their mouths. Both parent birds were near the nest, each carrying a bit of food, when we left. Pickwell (1931:140) states that young Prairie Horned Larks are fed "within an hour or two following hatching."

At 6 a.m., June 19, we found all four young hatched. One held its mouth wide open during the whole of our three-to-four-minute visit. This was probably the youngest of the brood, for it was slightly the smallest, and its down was a trifle yellower than that of the others. The parent larks objected mildly to our presence.

Near the Sylvia Grinnell River, well west of the flats about the Base, we collected that day two male larks and a female, the males with greatly enlarged testes, the female with well-defined brood-patch and swollen oviduct. All three of these specimens were yellow-faced, and we saw no white-faced lark among the four pairs we saw in that area. The plumage of the female was much worn. Another female, which we watched at the west edge of the Base, was feeding young. From the smallness of the mouthfuls she carried we judged that her brood had only recently hatched. We did not find her nest or see her mate.

On June 20 we spent several morning hours on Davidson Point. We saw in that area four yellow-faced males (one of which we collected) and a pale-faced male, but not a single female. A male whose facial colors we did not check on was in the air, singing.

On June 21, at the Base, we followed a yellow-faced female about for half an hour, hoping she would lead us to her nest. Suddenly she was joined by a yellow-faced male, which squatted a foot or so from her, fluttered his wings, and, while looking directly toward her (as well as toward us), spread his black chest-patch in a rather striking display. This must have entailed a lifting of the feathers at each side of the chest, or possibly of the whole chest-patch. The display was unfamiliar to us, and we find no reference to it in Pickwell (1931), Bent (1942), or "The Handbook of British Birds" (1948, Vol. 1, p. 185).

On June 22 we closely examined the young larks in Nest 1, noting that their natal down appeared to be less colorful than it had been on June 18 or 19, and that it was of the same shade throughout the whole brood. The more we thought about, and searched for, pale-faced adults the more convinced we became that some young birds should be recognizably pale at various stages in their development. On June 22 we covered two or three square miles of high country north and northwest of the Base. The two pairs of larks we located in that area were about half a mile apart. All four birds were yellow-faced.

On June 24 we found Nest 2. It was along the edge of a small lichen-covered flat about half way to the top of the first hill east of the Base, and about a quarter of a mile from Nest 1. It held five eggs, all of which were less richly colored than those in Nest 1 had been. It neatly filled a deep cup in the lichens; was not sheltered in the least by a rock or tuft of grass; and was warmly lined with tufts of bog-cotton and willow-down. There was no pavement of pebbles or the like about it. Finding the nest required an hour's observation of the female,

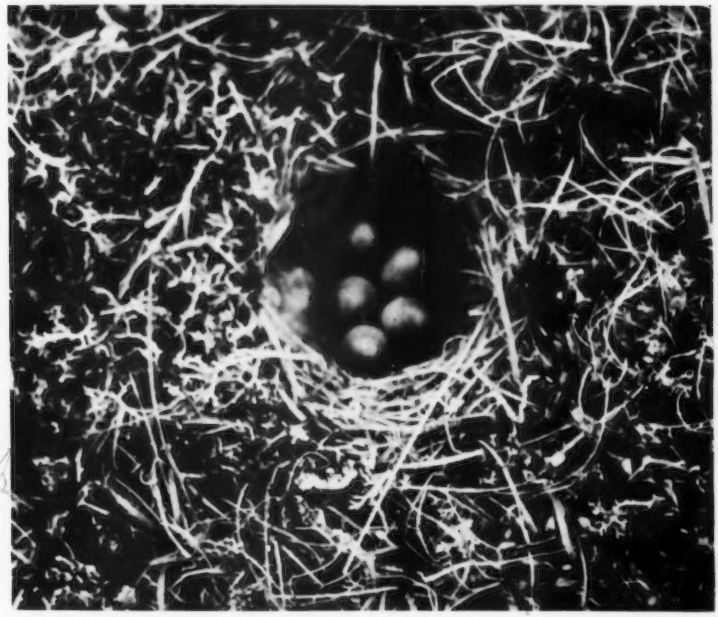

FIG. 1. Horned Lark Nest 2. Frobisher Bay, Baffin Island, June 25, 1953. Note warm lining.

whose behavior seemed to be profoundly affected by the singing of her mate. We watched the female through binoculars from a position which proved to be quite close to the nest. We could not keep her in sight all the time, for she had a way of walking upslope and disappearing among the moss and rocks. The male did not sing often. If he sang while the female was out of our sight, she promptly flew in and alighted close to us. If he sang while she was walking near us, she quickened her pace perceptibly, sometimes after an abrupt change of direction. His singing obviously heightened her desire to return to the nest. We found the nest by noting the directions she took when walking double-time immediately after the male's songs. The way in which instinct seemed to control her behavior was most interesting: unstimulated by the male's song, she wandered about with what appeared to be studied aimlessness; stimulated, she walked rapidly toward the nest for several feet then paused, as if reconsidering, and resumed her "studied aimlessness." The male, a yellow-faced bird, we did not often see that day. He sang not from the sky but from the ground upslope a considerable distance from us. We firmly believe that he was unaware of the female's absence from the nest, for neither did she call to him nor did he join her. The female was very dull-

FIG. 2. Young Horned Larks in Nest 3. Frobisher Bay, Baffin Island, June 25, 1953. Note (a) pattern of young lark's tongue; (b) absence of warm lining material.

colored. Her throat and eyebrows were grayish yellow and the dark markings of her head were indistinct.

We found Nest 3 on June 24. It was at considerably greater elevation than, and about three hundred paces from, Nest 2. It was in the side of a small, lichen-covered hummock, in this respect being very different from Nests 1 and 2. The area immediately about the hummock was, however, gentle in slope, almost flat. The nest contained four several-days-old young, one of which was slightly paler or grayer in tone throughout the upper parts than the others. This lack of warm tones was perceptible in the natal down as well as in the incoming juvenal plumage. The parent birds were both yellow-faced. The male we watched closely for some time before finding the nest. Refusing to feed the young because we were so near, he continued to carry about a great mouthful of food for them. This burden did not seem to affect in the slightest the clarity of his alarm-notes. Suddenly, seeing a large spider near him, he dropped the food, almost spitting it out; ran after, caught, and killed the spider, and went back promptly after the lost mouthful. Pickwell (1931:140) states that the male Prairie Horned Lark brings "greater burdens" of food than the female to the young.

FIG. 3. Young Horned Larks scattered below Nest 3. Frobisher Bay, Baffin Island, June 27, 1953. Note nest's thin, rumpled lining.

About half a mile east of Nest 3 we saw a very pale-faced male lark —almost a white-faced bird—on June 24. This individual we did not collect because we wanted to find its nest and ascertain the ratio of pale to "normal" young in the brood. We did not see a female in that area.

On June 25 we went to Nest 2 at 7:30 a.m., finding none of the five eggs hatched. The female was not there. Presently she flew in and we withdrew long enough to permit her to return to the nest. For about an hour thereafter we waited, hoping to see the male take food to her, but he did not appear. At Nest 3 we took photographs so as to record the pattern of the young lark's open mouth. The mouth-lining was rich yellow save for a dusky spot at the tip of each mandible and three dusky spots on the tongue—one at the very tip and one on each side just back from the tip. No photograph in Pickwell (1931) or Bent (1942) shows this pattern at all accurately. This may be largely because yellows tend to photograph over-dark.

On June 26 we collected a yellow-faced male lark in high country about a mile northwest of the Base. The yellow was most intense on

the forehead and in the middle of the throat. The whole superciliary line was clear pale yellow.

On June 27 we visited Nest 1, finding only three young there. Not having marked the brood, we could not be sure that the missing bird was one of the three that had hatched between 5:45 a.m. and 3:15 p.m. on July 18, but we suspected that it was the oldest of the siblings and that it had left normally, for there was not the slightest indication otherwise that the nest had been visited by a predator. We banded the three young, all of which settled down as we returned them to the nest-cup. Their willingness to stay surprised us.

We also visited Nest 3. Here we found the brood crouching motionless within a few inches of the nest. We banded all four and were surprised that none made much of an attempt to get away. One was decidedly yellow throughout its under parts, the others white-bellied. The bird with the grayest upper parts and palest down was white-bellied. This individual we color-banded (blue over aluminum). Why the young were out of the nest we could not understand. The nest was not sheltered in the least from the wind; indeed, being at the hill's brow and near the top of the hummock, it was in a decidedly exposed position. Furthermore—and this may have been an important factor—it was very thinly walled and poorly lined. There was not a feather nor a bit of bog-cotton, willow-down, or hair in it. When we returned the four young to the nest-cup they settled down immediately.

Nest 2 held four young and one egg when we inspected it at 8 a.m., June 27. The natal down seemed to be of exactly the same rich shade of yellowish buff throughout the brood. The young birds opened their mouths, but made no begging sound.

On June 27 we found Nest 4. It was toward the tip of Davidson Point near the edge of a great gravel flat, in the very top of a foot-high, lichen-covered hummock. It contained three eggs. The site was exceptional, for the hummock and a score of similar hummocks close by all stood in water about an inch deep. We found the nest after watching the female—a yellow-faced bird—for about 20 minutes. We did not see her mate. The nest was fully a mile from any nest we had thus far found. Like Nest 2, which also was surrounded by lichens, it had no pavement of pebbles, etc.

On June 28 we visited Nests 1, 2, and 3. In Nest 1, at 6 a.m., there were only two young. Another sibling probably was in the vicinity, but we failed to find it. The two young left the nest when touched. They hopped and hobbled rapidly off, spreading their wings, but making no attempt to fly. Their departure must have been very slightly, if at all, premature, for we could not have frightened them badly. They were about 10 days old. Pickwell (1931:142, 143) states that young Prairie Horned Larks leave the nest, normally, on the tenth day.

At Nest 2 we saw the male and the female parent each take food to the young direct. We visited the nest at 6:45 and 10 a.m., ascertaining that there were only four young. One egg of the five failed to hatch. The young birds, when open-mouthed, made no sound that we could hear.

At Nest 3 (at 7:20 a.m.) all four young were scattered about the hummock much as they had been on June 27. They made no attempt to get away from us. Near one of them was a slight accumulation of droppings. One bird, after being held in the hands for a time, livened up and opened its mouth for food. It did not, however, make a sound of begging. An adult female lark gave cries of protest in the vicinity but did not come very close. At 7:50 p.m., we found only two young on the nest hummock.

Starting on the evening of June 28, a four-day spell of very bad weather made life difficult for the Nest 3 brood. The wind was not particularly strong, but the sky was gray and fog hung low much of the time. Often it rained. When we visited the nest early in the morning on June 29 we found three young larks on the hummock, outside the nest-cup. They were obviously in poor condition, being stiff and wet. When we returned to the nest at 7:45 a.m., one of them was dead, and the other two looked half-dead. A parent lark continued to give alarm-chirps in the vicinity but the two living young looked as if they had been utterly deserted. We preserved the dead nestling as a skin. It was a white-bellied female.

We visited Nests 1 and 2 also on the raw, wet morning of June 29. At Nest 1 we found no larks, either adult or young, anywhere in the vicinity. At Nest 2 the four young were arranged with heads all pointed toward the middle and lifted, as if ready to receive food from that position (see Pickwell, 1931, plate 33, fig. 1).

Late in the afternoon on June 29 we found Nest 5. This was near the building in which we lived at the east edge of the Base. We had passed it many times in our comings and goings. It held four eggs. It was about 400 yards from Nest 1 and 300 yards from Nest 2. It was warmly lined with white dog hair, and had a slight pavement of pebbles to the west. We found it by paying close attention to the female (yellow-faced), which we chanced to see flying low 50 yards or so from the nest. She must have been used to human beings, for she returned to the nest rather promptly despite our standing, in full view, not far away.

For some time on June 29 we watched a male lark in flight-song. The weather was very bad—the sky gray, the wind cold. But the bird sang determinedly—almost as if in counter-challenge to the weather.

On the morning of June 30 the two young larks just outside Nest 3 were dead. One of them bore the color-band. The only adult lark in the vicinity was a female. The loud alarm-cries of this bird suggested the possibility that one member of the brood was still alive. The two dead nestlings we preserved as specimens: one was a white-bellied male (color-banded); the other a yellow-bellied female. Thus became apparent an interesting fact: in this brood one female was white-bellied, another yellow-bellied. In the prepared skins the difference was striking. The gonads in each of the three nestlings had been clearly visible: there was no doubt as to their sex.

We visited Nest 3 again on the morning of July 1. An adult female lark was there—again giving alarm-cries. This convinced us that one bird of the brood was alive, but we could not find it. It probably was

older than the others, had claimed food promptly, and survived. Pickwell (1931:143) summarizes the procedure by which the older young Prairie Horned Lark (or Larks) may, through pushing "to that side of the nest over which the food always comes," survive at the expense of the rest of the brood. Parmelee followed a female lark (yellow-faced) about for some time north of the Base and finally found a young bird it was feeding. In approaching and leaving the young bird it invariably walked (i.e., did not fly). The young bird, which was unbanded, ran well but could not fly. This observation made clear that a young lark, though it hops when first out of the nest, may learn to run before it learns to fly.

A soldier told us of finding a bird's nest on a high gravel flat about half a mile southeast of the Base on July 1. In the nest were two "spotted" young birds, alive, and outside it a third young one, dead. Almost certainly this was a Horned Lark's nest, for longspurs nested only in the grassy meadow-tundra of that area, and a bunting nest or wheatear nest would have been among, or under, rocks. We learned nothing as to the fate of the two remaining siblings.

The weather was exceedingly bad on July 1—but we observed several male larks singing flight-songs that day.

On July 2 we caught and banded a young bird near the dump. It could fly a little. On the ground it ran—not very nimbly, to be sure, but ran rather than hopped. Only one parent, the male, was in sight thereabouts while we were chasing this young bird. In high country just east of the Base we saw a young bird which could fly well. Its remiges and rectrices were not of full length, however, so it probably had not been out of the nest more than a few days.

We visited Nest 4 (Davidson Point) on July 2. The nest and eggs were wet and looked deserted. Neither the male nor the female lark was anywhere to be seen. The four young in Nest 2 seemed to be doing well. At Nest 5, at the east edge of the Base, there were still four eggs. Watching with our binoculars, we had seen the female fly off when we were 60 yards or so away. This behavior to some extent explained why we had not found the nest earlier.

On July 3 we noticed that the natal down on one chick in Nest 2 seemed to be a little paler, or whiter, than that of the other three. We saw the female parent near this nest, but not the male.

On July 4 we banded the four young in Nest 2. The nestlings were quite calm while we lifted them out and attached the bands, but as we were returning them to the nest-cup the father bird flew in and gave an alarm cry, one of the young cheeped sharply in response, and the male flew straight at us, thrashing about with extraordinary boldness and abandon. His wings touched us several times. The female too flew in, and by this time the panicky brood were making off in all directions. Never had we known a lark to behave as the male did: he was fairly beside himself with excitement. The female became excited too, when she heard her mate's cries and saw him flouncing about, but her demeanor was comparatively calm. Pickwell (1931:140-141), writing of *E. a. praticola*, states that the male's solicitude for the young "is restricted to calls." We caught the four young, returned them to the

nest, and quieted them down; but when we visited the nest again an hour or so later it was empty (save for the unhatched egg), and the young were nowhere to be seen. Their departure from the nest on this, their eighth or ninth day, probably was somewhat premature.

Visiting Nest 5, we found three young birds and one egg. We marked a toe of each of the three young with red fingernail polish. Neither parent bird was at the nest. The fourth young one had hatched by early morning of July 5. The youngest bird was perceptibly smaller and yellower of down than the others. Now that, twice in one season, we had noticed the intensely yellow tone of the down of a newly hatched lark, we decided that this color must fade rapidly, for after the first day the chick's appearance did not seem to be different from that of the rest of the brood.

On July 5, just north of the Base, along a little stream flowing past the hangar, we spent half an hour watching a pair of larks whose behavior led us to believe that they had a nest or young close by. Both larks were yellow-faced. The male had a large load of food, the female none. Repeatedly we saw the male, with mouth full, walk toward the female, flutter his wings in the manner of a young bird begging for food, then step rapidly off, exactly as if trying to attract her attention. Her only activity seemed to be the giving of alarm-cries. This she continued to do, while the male, still carrying food, ran back and forth, now standing beside her, with fluttering wings, now stepping coyly off to one side. Suddenly a young bird, well fledged, flew past the female, alighting within a few feet of her. The male departed. The female made no move to feed the young bird.

On July 5 a civilian contractor with whom we had become acquainted showed us a lark nest (No. 6) he had found near a little lake in high country about two miles north of the Base. The nest was warmly lined with soft material and surrounded by a pavement of angular pebbles. There were four eggs. The incubating female (yellow-faced) was remarkably fearless. She allowed us almost to touch her. When finally she left the nest she ran off a short way and stood quietly with feathers fluffed out. We did not see her mate.

Two larks which Sutton saw near the empty Nest 3 at the top of the hill just east of the Base on July 5 acted as if they were pairing. This reminded us that we had not yet found the slightest evidence of two-broodedness. On Davidson Point, Parmelee saw a pale-faced adult male and found a dead young lark which probably had left the nest only a day or so before.

From July 5 to 12 we noted so much flight-singing and so many times saw larks chasing each other as if in courtship or defense of territory, that we were confident certain pairs were about to proceed with a second nesting for the season. We observed no copulation or nest-building, however, and the only additional nest we found almost certainly was a first one for the season — or at any rate the female which built it had not already reared a brood in 1953. We found this nest on July 10. It held four eggs—which, since they floated big-end-up, probably had been incubated several days. The nest was on a high, narrow, gently sloping shelf between a big lake and the "HBC

River"—our name for a stream which emptied into the bay not far from the Hudson's Bay Company post. The nest was warmly lined. It was sheltered somewhat by *Cassiope*. We found it through watching a yellow-faced male we happened to see along the lake shore, a long way downslope from the nest. He was carrying a spider or insect in his bill, so we watched him. Presently he caught a large crane-fly and started flying uphill. The farther he flew the more convinced we became that he was going to a nest rather than to a young bird, for young larks had a way, we had noticed, of following the parents about. The male flew three hundred yards or so. Using our binoculars, we watched him alight, marked the spot, and followed. We did not see him again, but we flushed his mate (a yellow-faced bird) from her nest only a few feet from the spot at which we had seen him alight.

This would seem to be fair proof that the male takes food to the female while she is incubating. The "Handbook of British Birds" has nothing to say about the subject. Sutton (1932:215), writing of *E. a. hoyti* observed by him on Southampton Island, says that the male "occasionally brings . . . food" to the incubating female, but he discusses no specific observations. Pickwell (1931) apparently never saw a male *E. a. praticola* take food to the incubating female. On p. 91 he says: "The male, beyond occasional call notes, showed little or no solicitude while eggs were in the nest."

On July 10 we spent some time near the site of Nest 1. We saw there a banded young lark being fed by both parents. All three were remarkably tame. The young bird could fly well, though its wings and tail were not quite full-length. We assumed that it was from Nest 1—a natural, though unwarranted, assumption. In any event, the observation was of interest, for the last young lark banded by us we had banded on July 4, and that individual had already left the nest, so the parent larks were feeding progeny at least six days out of the nest. The begging cry of the young bird was a soft *sweet*, so faint it was hard to hear.

On July 10 we visited Nest 5, finding it destroyed. It was out of its cup and strewn about, and the four dead young, together and somewhat flattened, but neither crushed nor partly eaten, were about six inches west of the nest remains. We noticed that a big plank by which we had marked the nest-site was no longer there. Workmen probably had stepped on the nest while carrying off the plank.

On July 11 we collected an almost white-faced female in high country about a mile and a half north of the Base. She had a well-defined brood-patch. We did not see a male with or near her. We visited Nest 6, finding that it held only three young, all of them about the same in down-color. The female parent was still very tame. Here we made a point of placing our ear close to the five-days-old brood, finding that they produced a faint sound of begging.

On July 12 we saw two banded young larks on the flat near the dump —both of them still being fed. We were not sure how many adults were feeding them, and they may well not have been siblings, though they certainly were of about the same age. The spot was very near that at which we had caught and banded the single young bird on

July 2: it was about half a mile from the place at which we had seen the banded bird being fed on July 11; and it was even farther from the nests at which we had banded the young on June 27 (Nests 1 and 3) and July 4 (Nest 2). So, despite our not knowing exactly which birds we were seeing, we had good evidence that at least one young lark had travelled half a mile or so in following its parent (or parents) to a favorite feeding-ground. We must have seen a total of 20 larks near the dump on July 12, half or more of them strong-flying young birds. Among the three or four adult males there was a good deal of full-voiced, fervent singing, all from the ground. In a wholly different area we observed one male singing a flight-song.

That same day we visited Nest 6 on Davidson Point, to our great surprise finding there three fine young larks, all of them ready to leave. No bird of the brood was especially pale or gray above, but on the under parts one was strikingly yellow, the other two white. We color-banded the brood, each on the right leg, dark green over aluminum. We returned them to the nest-cup, but they would not stay.

We heard no full song of any sort—either from the ground or from the air—after July 12. The nesting season was over. Dr. V. C. Wynne-Edwards told us of an incomplete song heard by him on July 15. In four of the seven nests we had observed, some or all eggs of the clutch had been laid after June 14 (the date of our arrival), but we had failed to find the nests early enough to obtain data as to the length of the period requisite for producing a brood. Terrill (1917:138) had reported a period of "twenty-five days, or possibly a little less," for *E. a. praticola*. We had been hoping to prove that *E. a. alpestris* could, with the help of the long arctic days, bring out a brood in a significantly shorter time. The following table presents certain of our nest data concisely.

TABLE 1

SEVEN BAFFIN ISLAND HORNED LARK NESTS

Nest No.	Date found	Clutch-size	No. young that hatched; date of hatching	No. eggs that did not hatch	No. young known or believed to have died at nest	No. young known or believed to have left nest normally	Approx. date of leaving nest
1.	June 17	4	4, June 18-19	0	0	4(3*)	June 27-28
2.	June 24	5	4, June 27	1	0	4*	July 4
3.	June 24	4	4, *circa* June 19	0	3	1(?)	June 29
4.	June 27	3	3, *circa* July 3	0	0	3*	July 12
5.	June 29	4	4, July 4-5	0	4	0	———
6.	July 5	4	4, July 8	0	1	3	July 18
7.	July 10	4	———	—	—	—	———

*banded while in nest

Inspection of Table 1 reveals the following facts: Clutch-size did not vary much. Five of the seven nests held four eggs; one held five eggs; one held three eggs. Of the total of 28 eggs, four (Nest 7) may or may not have hatched. Of the other 24 eggs, we know that 23 hatched and that one did not hatch. This one egg was of a clutch of five (Nest 2). Of the 23 young we know that four were destroyed (Nest 5) when they were about five days old; and that three died

(Nest 3) as a result of inadequacy of nest-lining, exposure of the nest-site, death of the male parent, or shortage of insect food during the very bad weather—or from all four causes. One young bird of a brood of four (Nest 6) disappeared when the brood was only a few days old. We feel quite sure that of the 23 young, nine (two from Nest 1; four from Nest 2; three from Nest 4) left the nest in good order.

Not apparent from Table 1 is the fact that the only poorly lined nest (No. 3) of the seven was 75% (perhaps 100%) unsuccessful. Various authors have discussed the possible correlation between thickness of nest-lining and earliness of nesting. Hess (1910:26), writing of *E. a. praticola*, has this to say: "First nests are placed in closely cropped pastures, sunken even with the surface and, woven solidly, are able to withstand the fierce March winds. The June nests are placed at the hills of corn and so loosely constructed that one as a whole could not be lifted from the ground." Our Nest No. 3 was just such a nest as one of Hess's "June nests." Indeed, we tried to preserve it and it went to pieces while we were lifting it from its cup. Absence of warm lining material obviously was not correlated in this case with lateness of season; nor was a nest found March 31, 1922, at Pittsburgh, Pennsylvania, and reported on by Sutton (1927:140-141), warmly lined despite its being an early nest for that latitude. Nest 3 was an abnormal nest in two respects: it was very poorly lined, and it was placed near the top of a hummock in a position which exposed it to the wind.

On July 16 we saw several adult and young larks on the flat near the dump — among them one banded young bird. Two adult males sparred a bit, as if in territorial fight, but the dispute did not last long. Interested in checking plumage-stage, we collected a yellow-faced adult male and the unbanded, full-winged young bird which persisted in following it about, begging for food. The begging cry was virtually the same as that which we had heard from much younger birds. We were surprised to find both specimens molting. The adult male (GMS 11760), a worn and dirty bird, had dropped virtually all the greater and middle wing coverts, many upper tail coverts, some of the inner primaries, and a considerable number of feathers from an area in each side of the chest. In the young bird, a male (GMS 11761), the primaries were molting—again from the innermost outward; but all 12 tail feathers were present, and the body plumage was still largely juvenal.

DESCRIPTION OF SPECIMENS

The following seven adult Horned Larks were taken in the vicinity of the United States Air Force Base, near the head of Frobisher Bay, in the summer of 1953. The measurements are in millimeters.

No.	Sex	Date	Wing	Tail	Culmen	Tarsus
GMS 11709	Male	June 19	113	76.5	13.5	24
DFP 50	Male	June 19	111	73	14	24
GMS 11713	Male	June 20	112	76	14	24
GMS 11727	Male	June 26	110	74	14.5	25
GMS 11760	Male	July 16	113	72.5	14.5	24
GMS 11710	Female	June 19	102.5	63	12.5	23.5
GMS 11749	Female	July 11	100	62	13.5	23

The males of this series are all yellow-faced, the most colorful being GMS 11713, the least colorful, GMS 11709. The less yellow of the two females, GMS 11749, is decidedly the whitest-faced bird of the whole series. In this specimen the throat is pale yellow, but the white neck-plumage bordering the black chest-patch is only very slightly tinged with yellow, and the forehead, superciliary area, and feathers encircling the eye are all grayish white, without any yellow whatever. The palest-faced of the males (GMS 11709) is considerably more yellow through the forehead and fore part of the superciliary area than this pale-faced female.

A young male in juvenal plumage collected on July 16 (GMS 11761) is white-bellied, but the white is suffused with grayish yellow. The wing of this specimen measures 99.5 mm., the tail, 59. The two grayish brown middle rectrices are crossed toward the tip by four irregular blackish brown bars.

The three young birds from Nest 3 (female, GMS 11732, June 29; male, GMS 11734, June 30; and female, GMS 11735, June 30) had, it must be remembered, yellow-faced parents. We did not collect either of the parents. All three nestlings are yellow on the chin and throat, but the last is strikingly yellower throughout the under parts than the other two. The one male of the three is the least yellow, or least colorful, generally speaking. In this specimen the natal down clinging to the sides of the crown and the light spots at the tips of the crown and hind neck feathers are grayish white rather than warm yellowish buff, as in the other two.

Whatever the correlation between this apparent dichromatism among nestlings and the admixture of yellow-facedness and white-facedness among adults, most certainly we did not encounter in the Frobisher Bay area the "predominance of pallid types" reported for the head of Clyde Inlet by Wynne-Edwards (1952:375). What we found was yellow-faced birds — with a mere scattering of pale-faced *hoyti*-like individuals. Such populations, "with *alpestris* characters predominant," Soper (1946:418) has reported for southern Baffin Island as a whole. In our collecting from about July 1 on we *tried* to obtain white-faced birds. The ratio of six yellow-faced individuals to one white-faced would not necessarily, therefore, hold for the entire population. Of the 15-20 males we continued to see in the vicinity of the Base, not one was really white-faced, and only one did we describe in our notes as "pale-faced." The females all seemed to be yellow-faced with the possible exception of the female at Nest 2, a very dull bird. This individual was yellow-throated, but her face otherwise may well have been without yellow tinge. Our Davidson Point notes include repeated comments on a white-faced male, but we believe that only one such bird lived there. Another white-faced male lived half a mile east of the Base, near a Snowy Owl nest we often visited. Totalling, as accurately as we can, the yellow-faced and white-faced birds observed, we obtain a ratio of about 10:1 for the males and 7:1 for the females. If, therefore, the pale-faced birds represent the subspecies *hoyti*, and the yellow-faced birds *alpestris*, we are forced to conclude that, in so far as color is concerned, *alpestris* is predominant.

With regard to size, we feel less certain. Our Frobisher Bay adult specimens, listed above, average: males, wing, 111.8, tail, 74.4; females, wing, 101.2, tail, 62.5. Ten male *E. a. alpestris* from Labrador measure: wing, 111, 110, 116, 109, 113, 106, 111, 110, 111, 111 (average, 110.7); tail, 67, 67, 70, 65, 70, 62, 66, 66, 63, 73 (average, 66.9). Ten females from Labrador measure: wing, 103, 104, 102, 106, 100, 103, 100, 102, 105, 108 (average, 103.3); tail, 62, 59, 58, 59, 52, 60, 62, 60, 62, 67.5 (average, 60.1). Our Baffin Island males are, it will be noted, considerably longer-tailed than the Labrador males. Otherwise there is no very great size-discrepancy. *Hoyti* and *alpestris* are both described as "large northern races."

NEST SUCCESS AND SPECIES SURVIVAL

Of the seven nests we found (see Table 1), three were known by us to have been more or less unsuccessful—Nest 5, 100%; Nest 3, at least 75%, Nest 6, at least 25%. About Nest 7 we knew only that it held four much-incubated eggs on July 10, that it was warmly lined, and that it was somewhat sheltered by *Cassiope*. We know, because we saw bands on their legs, that at least two of the several nestlings we watched from day to day lived long enough to fly strongly, but neither of these individuals was obtaining all its own food on July 12, the latest date on which we saw them.

We did not obtain the slightest evidence of two-broodedness. We found no deserted eggs; obtained only a bit of evidence of predation—namely, the disappearance of one young bird from the brood at Nest 6; found no Horned Lark remains, either of adult or young, at any of the several Snowy Owl nests we visited more or less regularly. Weasels *(Mustela erminea)* and foxes *(Alopex lagopus)* were exceedingly scarce in the area we studied most thoroughly. Lemmings *(Lemmus trimucronatus* and *Dicrostonyx groenlandicus)* were common, even locally abundant, but nothing that we observed convinced us that these rodents were predatory in the usual sense of the word.

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SUMMARY

1. At the United States Air Force Base near the head of Frobisher Bay, southern Baffin Island, the Horned Lark was one of the four commonest nesting birds in the summer of 1953. We recorded it also in the high interior north and northeast of the Base, at the mouth of the

Jordan River, at Lake Amadjuak, at Cape Dorchester, and near a large lake about 50 miles east-northeast of Wordie Bay. We did not find it on islands at the head of Frobisher Bay.

2. The Frobisher Bay breeding population was an admixture of "yellow-faced" and "white-faced" birds, the former predominant. The ratio of *observed* yellow-faced to white-faced males was 10:1, of females, 7:1. In each of two broods whose parents were both "yellow-faced," one nestling was very yellow-bellied, the others white-bellied. In one of these mixed broods, the yellow-bellied bird was a female, one of the white-bellied birds was also a female, and one white-bellied bird was a male. The white-bellied male was distinguishable from all three of its siblings by the whiteness (rather than buffiness) of both the natal down and the spots on the incoming dorsal juvenal plumage.

3. By June 15 most larks of the Frobisher Bay area were paired, many nests finished, and some clutches laid. On that date we saw at least 15 males, but no females. The females probably were on their nests. Our latest date for a nest with eggs: July 8; for a nest with young: July 13. We obtained no evidence of two-broodedness.

4. We saw a male displaying by facing the female squarely and lifting or spreading the feathers of his black chest-patch.

5. We obtained no evidence that the male lark incubates the eggs or broods the young. We saw a male make a long flight with food to an incubating female, but were not sure that the food was delivered at the nest proper.

6. A female we were watching while discovering her nest invariably flew in toward the nest if the male sang when she was several rods away; if she happened to be near the nest when the male sang, she instantly turned toward the nest, walked rapidly in that direction for a short distance, then, as if recognizing us as untrustworthy, resumed a studied aimlessness.

7. We saw a male lark, with mouth full of food for the young, several times approach his empty-mouthed mate with wings fluttering, then step rapidly to one side as if trying to attract her attention. The female was devoting her energies solely to alarm-cries.

8. A male bird which was near the nest while we were banding the young on their eighth or ninth day, heard a chirp from one of the young and flew in boldly, fluttering about our hands and arms, pecking and chirping. This caused the young to hop off in all directions. Although put back into the nest, they did not stay long.

9. Nestlings received food from both parents direct within a few hours of hatching. Newly hatched young made no sound when begging. Five-days-old nestlings produced a begging sound faintly audible to a human ear about 12 inches away.

10. In each of two nests the down of the last nestling to hatch was of a brighter shade of yellowish buff than that of its day-old siblings.

11. Young birds left the nest on their ninth or tenth day, a day or so before they could fly. When they left the nest they hopped; but they learned to walk and run before learning to fly. Their food-call after leaving the nest was a soft *sweet*. This call they continued to give until at least their sixteenth day. The adult had no similar call.

12. The last full songs of the season we heard on July 12. An incomplete song, heard on July 15, was reported to us.

13. We saw a banded young bird being fed by its parents at least six days after it had left its nest. We also saw a strong-winged banded young bird which had followed its parent or parents at least a half mile from its nest to a flat much frequented by larks all summer.

14. Of seven nests observed, one held five eggs, five held four eggs, and one held three eggs. Of the 28 eggs, we know that 23 hatched and that one did not hatch. (One clutch of four may or may not have hatched.) Of the 23 young, at least nine left the nest in good order.

15. Of the seven nests all but one were warmly lined. The poorly lined nest was also the most exposed to the weather, the greatest in elevation above sea-level, and one of the least successful, for three of the brood perished from starvation or exposure (or both) when about a week old. Another nest, 100% unsuccessful, was probably stepped on by a workman. No nest of the seven was destroyed by a weasel, fox, raven, owl, or other predator.

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WEIGHTS OF SOME SMALL BIRDS IN CENTRAL NEW YORK

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The wide range of birds, and their long migratory travels, as well as their rapid rate of metabolism, great diversity of food and their close contact with mankind make them an extremely important ecological factor. An understanding of these relationships and their importance depends in part upon a knowledge of their weights.

Considerable information already has been published on some species, and extensive studies have been carried on in some localities. The birds in the area around Syracuse, New York, however, have not been so studied. This study records information on weights of 68 species collected in the immediate vicinity of Syracuse. Over 1650 weights were recorded from living birds taken at a bird-banding station on the Syracuse University campus, and 800 additional weights were taken from fresh specimens shot in adjacent areas for various purposes. More than ten individuals for each of 16 species furnish most of the information on variability in this study.

METHODS

Live birds were removed from the traps three to five times daily. They were taken to the laboratory, which was within 100 feet, where they were banded immediately, wrapped in a small piece of cotton cloth, and their weights taken on a Chatillon spring balance which had a capacity of 500 grams and a sensitivity to ½ gram. The balance was equipped with a movable dial, and this was always set in the zero position with the cloth on the scales so that the weights of the birds could be read directly. Birds handled in this way were quiet during the weighing, and as the cloth was unrolled they were allowed to fly free. No known injuries resulted from this method of handling, and the fact that they returned readily indicates that they were not unduly frightened.

It is realized that the birds have varying amounts of food when weighed, but this is always true of wild-caught birds, and no attempt was made to account for it. Stevenson (1933) found that food averaged about 1.5 percent of the weight in similar species of birds. Care was exercised to exclude weights from specimens showing signs of abnormality such as sickness, injury, and excessive wetting. Baldwin and Kendeigh (1938), in their study of variation in bird weights, showed that the effect of the trap habit was negligible on weight. This agrees with the weights taken during this study. Therefore, all weights are included and repeated weights of the same individual treated the same as a single weight for each specimen.

There was more divergence in handling the killed specimens because of varied field conditions and lapse of time before weights could be taken. Cotton wads were placed in natural openings and shot wounds as soon as the specimens were taken, to prevent bleeding and contamination of the plumage. Birds were then placed separately in paper cones and carried in a field bag. Generally no more than six individuals were

taken on each trip. Weights were not taken from badly damaged specimens.

In this study all weights are recorded to the nearest gram and all averages are recorded to the nearest one-tenth of a gram.

WEIGHT DIFFERENCES BETWEEN DEAD AND LIVING SPECIMENS

Sufficient observations were made on ten species to compare the weights of dead and living specimens. Table 1 summarizes this information. The great amount of variation is due in part to the small numbers involved. In some cases the dead specimens actually weighed more than the living specimens of the same species. This is in keeping with what Baldwin and Kendeigh (1938) have shown, that "random weights may be obtained that are higher or lower than the average of any individual bird." The variations shown in Table 1 do not exceed the variations exhibited by individuals of the same species, as will be explained later.

TABLE 1

Differences in weight between dead and living specimens

Species	Living		Dead		Difference	% of Dead Weight
	No. of Records	Average Weight	No. of Records	Average Weight	Grams	
Northern Blue Jay	3	90.0	4	84.9	—5.1	6.0
Eastern Cowbird	18	48.6	7	44.9	—3.7	8.2
White-crowned Sparrow	39	31.5	2	32.2	+ .7	2.2
White-throated Sparrow	570	27.5	9	26.8	— .7	2.6
Slate-colored Junco	404	19.7	5	19.1	— .6	3.1
Eastern Song Sparrow	278	20.7	15	22.3	+1.6	7.2
Eastern Fox Sparrow	8	38.5	8	39.0	+ .5	1.3
English Sparrow	272	28.7	22	28.6	— .1	.3
White-breasted Nuthatch	3	21.7	9	20.6	—1.1	5.3
Black-capped Chickadee	3	11.0	11	11.4	+ .4	3.5

When all differences shown in Table 1 are combined on the basis of the minimum number compared in each species the average loss of weight per individual is 4.3 percent of the weight of the dead specimen. A much greater loss would be shown by specimens badly damaged during collection. On the basis of these findings the live weights of carefully and freshly collected specimens could be approximated by adding 4 percent to the dead weight. Four percent was added to the weights of dead specimens to make them comparable with the weights of living specimens in determining seasonal variation.

SEX DIFFERENCES IN WEIGHT

The species are grouped in Table 2 according to sex differences in weight. This table reveals that a considerable variation exists between species in this regard. Thus in one pair of eastern solitary sandpipers the female exceeded the weight of the male by 58 percent. The other extreme is shown in the weights of 16 eastern redwings in which the females average 37.3 percent less in weight than the males.

TABLE 2

Sex differences in weight

Group A. Sexes weigh approximately the same

Species	Males		Females		% Diff.
	No.	Average Weight	No.	Average Weight	
Northern Downy Woodpecker	7	26.6	2	26.3	1.1
Eastern Phoebe	1	21.4	1	21.1	1.4
Eastern Yellow Warbler	1	11.5	1	11.3	1.7

Group B. Males heavier than females

Killdeer	1	121.8	1	95.7	21.4
Eastern Hairy Woodpecker	2	74.7	3	70.5	5.6
Eastern Kingbird	2	40.3	1	36.7	8.9
Prairie Horned Lark	3	35.7	2	34.3	3.9
Northern Blue Jay	1	93.3	1	64.2	31.2
Eastern Crow	1	652.6	1	449.0	31.2
Starling	253	81.9	216	76.2	7.0
Eastern Cowbird	15	49.3	10	40.6	17.6
Eastern Redwing	16	65.9	5	41.3	37.3
Eastern Goldfinch	13	13.0	4	12.6	3.1
Eastern Tree Sparrow	6	20.6	1	19.2	6.8
Lincoln's Sparrow	1	17.8	1	16.5	7.3
Scarlet Tanager	1	30.0	1	20.0	33.3
English Sparrow	147	29.1	146	28.3	2.8
Catbird	5	45.3	3	40.8	9.9

Group C. Females heavier than males

Eastern Solitary Sandpiper	1	38.3	1	60.7	58.5
Spotted Sandpiper	1	46.3	3	48.6	5.0
Northern Flicker	2	121.8	1	131.1	7.6
White-breasted Nuthatch	2	19.6	2	20.6	5.1
Eastern Robin	11	84.6	7	86.9	2.7
Eastern Bluebird	8	31.6	4	33.5	6.0

Sex cannot be determined with certainty in species like the sparrows and thrushes without dissection; therefore banding operations do not furnish such information unless the sexes are noticeably different.

The grouping in Table 2 agrees fairly well with the findings of Baldwin and Kendeigh (1938). Observations on all the species are included, although the number of records for several species is too small to be more than an indication. It is probable that with larger numbers of observations the grouping of some of these species would change.

SEASONAL VARIATION IN WEIGHT

Banding operations were carried on during April, May, June, September, October and November. The majority of weights therefore were taken during the spring and fall migrations. With few exceptions the species whose principal diet was insects were heavier in the fall, and those whose principal food was seeds were heavier in the spring. There were some exceptions to this rule, but most of them were easily explained on the basis of few numbers of records. The English sparrow was an exception and also exceptional in its feeding habits. Its relative domestication may well explain why its weight does not conform to the pattern set by our native sparrows.

The eastern robin, eastern bluebird and eastern redwing were unexpectedly heavier in the spring although normally considered principally insect-eaters. These three species are the early arrivals in the spring and depart late in the fall. Robins sometimes stay all winter in protected areas. Perhaps this is good evidence that they depend considerably upon fruits and seeds and are able to increase their weight during the late fall and winter similar to the seed-eaters. This may also be one of the reasons they are among the first arrivals in the spring.

The following species were heavier in the fall:

Eastern hairy woodpecker	Swamp sparrow
Northern downy woodpecker	Eastern cardinal
Northern blue jay	Maryland yellowthroat
Starling	English sparrow
Eastern cowbird	Catbird
Bronzed grackle	White-breasted nuthatch
Eastern chipping sparrow	Black-capped chickadee

Those heavier in the spring were:

Eastern redwing	Eastern song sparrow
Eastern goldfinch	Scarlet tanager
White-crowned sparrow	Cedar waxwing
White-throated sparrow	Eastern robin
Eastern tree sparrow	Eastern bluebird
Slate-colored junco	

DAILY VARIATION IN WEIGHT BY SPECIES

Table 3 is a record of weights by the hour of day for seven species based upon 1600 records. The percentages are computed on the mean weight for the species, based on all records for that species and not

on just the individuals whose weight is recorded in the table. Too few weights were taken earlier than 8:00 A.M. or later than 8:00 P.M. to be included in the table. Birds start feeding much earlier than 8:00 A.M. in this area and continue to feed later than 8:00 P.M. Therefore more information is greatly to be desired for these periods.

The same changes in weight are shown that were found by Baldwin and Kendeigh (1938), Stewart (1937) and others. There is an increase during the morning hours until noon or a little after, then a leveling off or even a slight loss in weight, followed by another gain toward five to seven in the afternoon. The figures show a loss of weight during the night of 7 percent or more in some cases. It is believed that weights taken before feeding starts in the morning would show a greater loss of weight during the night, making the overnight loss at least 10 percent for the smaller birds. This would agree with the findings of Stewart *(l. c.)*.

DAILY VARIATION IN WEIGHT OF INDIVIDUAL BIRDS

The weights of two individuals from each of three species are presented in Table 4.

White-throated sparrow

Band Number 20-184703 was banded September 30 and recaptured 43 times to November 7.

Band Number 20-184742 was banded October 15 and recaptured 21 times to November 7.

Slate-colored junco

Band Number 48-55415 was banded September 26 and recaptured 34 times to November 7.

Band Number 21-21518 was banded April 28 and recaptured 37 times to May 20.

Eastern song sparrow

Band Number 50-80403 was banded April 4 and recaptured 21 times to April 30.

Band Number 50-80443 was banded April 21 and recaptured 25 times to May 14.

No change in average daily weight is shown by any of the six birds.

The maximum weight change within a 24-hour period for these three species is as follows:

White-throated sparrow	30.0%
Slate-colored junco	16.7%
Eastern song sparrow	20.0%

In each of the above cases the weights of the birds were normal thereafter. The greatest difference occurred between the 5:00 P.M. weighing and the 8:00 A.M. weighing. This difference probably would be greater if the morning weights were taken before any feeding had occurred. In each instance the bird concerned had been banded and had been recaptured from one to several times before the greatest change in weight occurred. Therefore the relatively light morning weight was not immediately following a night migratory flight.

Weight changes from 8:00 A.M. to 5:00 P.M. frequently varied from 5 to 20 percent, which makes the above maximums seem less spectacular. On this basis a 150-pound man would frequently vary from 7.5 to 30 pounds in body weight within nine hours or might even change in weight as much as 45 pounds in extreme cases. This certainly indicates that the physiological processes of birds differ widely from those of mankind.

TABLE 3

Average hourly weights by species

Species		Hour of Day												
		Forenoon					Afternoon							
		8	9	10	11	12	1	2	3	4	5	6	7	8
Eastern Cowbird	% of Av. Wt.	93.2	91.9				94.0			91.8				106.6
	Av. Wt.	45.3	44.3				45.7			44.6				51.8
White-crowned Sparrow	% of Av. Wt.	99.7	103.0	104.8		104.8	105.0	115.9		98.4		106.3		93.1
	Av. Wt.	31.4	32.5	33.0		33.0	33.2	36.5		31.0		33.5		29.3
White-throated Sparrow	% of Av. Wt.	96.7	93.5	109.5	100.7	104.7	102.9	102.2	103.6	102.2	100.4	110.2	111.6	104.4
	Av. Wt.	26.6	25.7	30.1	27.7	28.8	28.3	28.1	28.5	28.1	27.6	30.3	30.7	28.7
Eastern Chipping Sparrow	% of Av. Wt.	94.3		106.6			106.6				114.8			
	Av. Wt.	11.5		13.0			13.0				14.0			
Slate-colored Junco	% of Av. Wt.	101.0	100.5	103.0	103.0	106.0	104.1	102.0	98.5	101.0	92.4	105.6	105.6	95.4
	Av. Wt.	19.9	19.8	20.3	20.3	20.9	20.5	20.1	19.4	19.9	18.2	20.8	20.8	18.8
Eastern Song Sparrow	% of Av. Wt.	97.6	96.1	101.9	106.3	101.4	102.8	103.9	94.7	106.3	101.0	101.4	104.8	87.0
	Av. Wt.	20.2	19.9	21.1	22.0	21.0	21.3	21.5	19.6	22.0	20.9	21.0	21.7	18.0
English Sparrow	% of Av. Wt.	99.3	97.2	101.0	98.3	103.1	101.0	101.7	97.6	101.7	99.3	100.3		
	Av. Wt.	28.5	27.9	29.0	28.2	29.6	29.0	29.2	28.0	29.2	28.5	28.8		
Av. percentage (all species)		97.4	97.0	104.5	102.1	104.0	102.3	105.1	98.6	100.2	101.6	104.8	107.7	97.3*

*Some of these weights were taken after dark and loss in weight had begun.

TABLE 4

Daily weight variation in individuals

Specimen	Time of Day														
	Forenoon						Afternoon								
	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9
White-throated Sparrow															
Band #20-184703		20.4	20.8		21.0	22.0	22.0	21.5			22.0				
Band #20-184742		21.5	22.0		24.0	24.0		24.0			23.6				
Slate-colored Junco															
Band #48-55415		17.0	17.7			18.0	18.3	18.0	18.0		19.0		19.0		
Band #21-21518		18.9	20.0			21.7	18.5	19.0	20.0		20.8	20.5		18.0	
Eastern Song Sparrow															
Band #50-80403	18.0	18.0	18.5	20.5		19.0	19.3	19.5			19.0	19.0			
Band #50-80434	16.5	18.4	17.3	18.0		18.5	19.0		18.0		18.0	18.0		18.0	17.0

The greatest percentile change in weight is in the smaller birds. As the birds increase in size the percent of change diminishes.

Could this be in part a reflection of the ratio of surface exposed to body volume? Nice (1938) states "The smaller bird has a relatively larger surface than a larger bird and hence loses more heat than the other." Baldwin and Kendeigh (1938) mention that temperature and relative humidity must enter into this rapid change in weight. They found a direct correlation between relative humidity and weight and an inverse correlation between temperature and weight.

When one considers the respiratory system of birds and its direct relationship to all three of the above factors and realizes that all three of the factors operate independently and that they may all operate to supplement or to counteract each other as far as weight is concerned, the possibility of great change is evident. Taber (1938) concluded that the average daily food consumption was 15 or 16 percent of a bird's weight. This being the case, something in addition is needed to produce the greater changes in weight shown by these records.

We know that the metabolic rate is very high in birds and that the relative amounts of food consumed (15 or 16 percent of a bird's weight, according to Taber [1938]) also contribute to the weight change. Certainly the physiologist has a fertile field for further investigation.

SUMMARY

1. The relative weights of males and females differed in different species of birds. This study revealed that in some species the males averaged as much as 37.3 percent heavier than the females. In other species the females averaged as much as 36 percent heavier than the males and in still other species the sexes were nearly equal in weight.

2. Specimens killed (or shot) in the field averaged 4.3 percent lighter than living specimens of the same species.

3. With few exceptions the insectivorous species were heavier in the fall, while the seed-eating species were heaviest in the spring.

4. Birds increased in weight most rapidly during the morning hours. They then remained about the same weight or even lost some weight in the early afternoon, and this period was followed by another period of increase in the afternoon.

5. The greatest loss in weight occurred during the night. This loss probably averaged 10 percent or more for each species.

6. Individuals showed considerable daily variation in weight. The maximum weight change within 24 hours was 30 percent for the white-throated sparrow.

7. The greatest percentile change in weight was in the smaller birds. As the size of the bird increased the percentage of change decreased.

8. No noticeable effect on weight was shown by the development of the trap habit.

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State University of New York, College of Forestry, Syracuse 10, N. Y.

GENERAL NOTES

A Criterion for Young-of-the-Year in the Blue Jay.—It is advantageous to distinguish young-of-the-year from adult birds in late summer and fall, but in species with no definite plumage differences between young and old, it soon becomes difficult, and although one may have a pretty good idea which are which, it is not good enough for the record.

At Mastic, Long Island, I trapped and banded 25 Blue Jays from July 4 to September 7, 1953. There were an adult and young together on July 4, two young on July 5. Though of the opinion that the 21 banded later were all young, I was not sure of the age of any of them.

A Blue Jay's bill is black or blackish, from the outside. They frequently open their mouths when being banded, and I was interested to note that the inside of the bill of one of the young, July 5, was white. Of two on August 8, one had the inside of the bill entirely white, the other white except for a large black blotch on the inside of the upper mandible; one on August 9 (No. 543-70811), white with considerable black. The last one in which it was noted as all white was on August 23; and a bird on September 6 had it white with black blotches.

The thought that white inside of bill, being replaced blotchingly by black, was characteristic of young Blue Jays of-the-year, had been formulated, when it was confirmed by the next Jay trapped, on October 28, at Garden City, Long Island. This had the inside of bill black with a couple of white marks. But it remained to check the hypothesis.

Four individuals taken at Garden City, respectively on February 19, May 8, 21, and June 19, 1954; as well as No. 543-70811 of August 9, 1953 (see above), trapped as a return at Mastic May 16, 1954, had the whole inside of the bill black.

Furthermore, five young birds trapped at Garden City July 2 to 20, had the whole inside of the bill white (bluish white in 4, greyish white in one). Incidentally, the entire mouth farther back was pink, in noticeable contrast with that of the four adults, February 19 to June 19, in which it had been mostly black. Finally, I trapped a young bird in Garden City on July 29 which had the inside of the bill bluish white except for a small lengthwise black spot on that of the upper mandible. But for this bill character I could only have guessed at its age.

My conclusion is that white (or black and white) on the inside of the bill of a Blue Jay is a criterion of a bird-of-the-year which lasts into the fall. It is tangible, not relative, and very easy to see.—J. T. Nichols, The American Museum of Natural History, Central Park West at 79th St., New York 24, N. Y.

Bluebirds Attracted by Peanut Hearts.—These are further observations along the line of the note "Bluebirds Lured to Ground Traps" in *Bird-Banding*, **25**: 112, 1954. The Bluebird *(Sialia sialis)* is listed as a permanent resident in this area. No Bluebird has been taken in ground traps by us, but on our home acre 3 have been trapped (and banded) in a 4-cell Potter type trap on feeding trays placed on posts 4 or 5 feet above the ground as follows:

Band No.	*Date Banded*	*Date Retrapped*
21-116596 F	Jan. 18, 1953	Feb. 1, 1953 June 27, 1953
21-116872 M	March 23, 1953	—
21-171196 I or F	Oct. 25, 1953	—

The bait used was peanut hearts—the trade name given to the germ recovered as a by-product, in the manufacturing process.

We have been banding since March, 1946, but have never been able to attract Bluebirds to the feeding trays or the traps—until the early winter of 1952-53. At that time a pair of Bluebirds (male and female) found peanut hearts to their liking and came with increasing frequency. By the middle of January, 1953, they came regularly many times a day. Many visiting friends and adult and children's groups saw this pair of Bluebirds at close range through our observation "picture" window. This same pair (presumably, both banded) came regularly and continuously until late May and then gradually "tapered off" until late summer. A pair of banded Bluebirds (presumably the same birds) began coming for peanut hearts in October, 1953; they came regularly and continuously many times a day until late May, 1954. Thereafter they were seen less frequently but occasionally into July and August, 1954 (when this note was written). Although they were carefully observed, they were never seen to feed on anything but peanut hearts —although at times, apples, raisins, and other berries and fruits were available on the trays. During all of these times only 1 or 2 birds came at a time to the feeding trays.—Arthur H. Fast, 4924 Rock Spring Road, Arlington, Va.

RECENT LITERATURE

BANDING

1. XV. Report on the Bird-Banding in Hungary. (A Maggar Madartani Intezet 1933-1950. Evi Madarjelolesei. XV Jelentes.) Keve Andras. 1954. *Aquila* **55-58,** pp. 89-107. This compilation of returns and recoveries of 96 species of birds banded or recovered in Hungary is one of the first such lists available from the countries bordering the Iron Curtain. It contains a surprising number of records of birds banded outside Hungary, in Sweden, Finland, Germany, Holland, Russia, Poland, Czechoslovakia, Italy, most of them pre-World War II. The respectable number of post-war recoveries, however, indicates a definite upsurge in general banding in central and eastern Europe, and shows several banding programs under way of which no mention has been made in current literature: the Italians have banded many Quail *(Coturnix)* in migration; the Czechs have evidently been banding gulls in quantity, the Russians have been banding numbers of waterfowl.—O. L. Austin, Jr.

2. Portable Live Trap for Ducks, With Improved Gathering Box. J. D. McCall. 1954. *Journal of Wildlife Management,* **18**(3): 405-407. Described in this article is a single-funnel collapsible trap with a unique gathering box. A hinged gate is placed at the back of the trap with one edge fastened to the vertical end of the trap at a point 4 to 6 inches above the water. When the ducks have retreated to the rear of the trap, a rope is pulled to raise the horizontal portion of the hinged gate to a vertical position and thus enclose the birds in a compartment above the water. Approximately 4,500 ducks had been taken in this type of trap at the time the article was written. Details on materials and construction are provided.—Helmut K. Buechner.

MIGRATION

(See also Numbers 15, 33, 51, 52, 65)

3. Migration near Maloja and on the Splügenpass in the fall of 1952 and 1953. (Vogelzugbeobachtungen bei Maloga und auf dem Splügenpass im Herbst 1952 und 1953.) Ernst Sutter. 1954. *Ornithologische Beobachter* **51**(3): 109-132. This paper presents the results of the work of teams of observers in the Swiss Alps. Migration through the valleys and over passes was observed in unfavorable weather and with head winds. Under these conditions valleys and passes were used which did not conform to the normal direction of migration. With good weather and east winds the migration was observed at higher altitudes. These migrations occurred over a broad front and were little influenced by the valley system. Good weather migration occurred principally during the early morning hours.—R. O. Bender.

4. Spring migration in Sicily. (Über den Frühlings-Vogelzug auf Sizilien.) 1954. Joachim Steinbacher. *Die Vogelwelt*, **75**(4): 129-139. Annotated list of migrants in 1953. A contribution to visible migration across the Mediterranean. Need for autumn studies and for simultaneous observations on Sardinia, and on the coast of Tunisia are stressed.—Frances Hamerstrom.

5. Trans-Gulf Migration, Spring 1952. Harvey R. Bullis, Jr. 1954. *The Auk*, **71**(3): 298-305. Bullis adds a considerable amount of data to the ever-growing file on trans-Gulf migration by presenting detailed records of what must have been several thrilling nights aboard the M. V. *Oregon* in the northern Gulf of Mexico. The period of observation extended from March 31 through May. All of the major flights observed took advantage of favorable southeasterly winds. When some of the flights met head winds near the northern Gulf Coast they continued to fly toward the coast and into the adverse winds. There seems no reason to question any further the reality and magnitude of trans-Gulf migration.—J. C. Dickinson, Jr.

6. The Homing Ability of Caged Carrier Pigeons. (Das Heimkehrvermögen Gekäfigter Brieftauben.) Gustav Kramer and Ursula von Saint-Paul. 1954. *Der Ornithologische Beobachter* **51**(1/2): 4-12. Eighteen carrier pigeons were kept caged to prevent their acquiring visual or sensory familiarity with their home by any means which required free movement about the area. Ten other pigeons of the same age (9-10 months) which were permitted free flight about the home area but which received no special homing training were used as controls. All of the birds were transported 320 km. south in covered cages so that they could not see the sky or the countryside. From the similarity of their behavior upon release, presented in full detail, the authors conclude that homing ability is not dependent on extensive familiarity with the home environment acquired by movement about the area. This in turn supports the sun navigation theory of homing, although this requires sensory qualities not proved to be possessed by birds. This work is a very valuable contribution.—R. O. Bender.

7. Winter Distribution of Robins East of the Rocky Mountains. J. Murray Speirs. 1953. *The Wilson Bulletin*, **65**(3): 175-183. The winter distribution of Robins, *Turdus migratorius*, east of the Rocky Mountains is clarified by this analysis of bird-banding recoveries and Christmas censuses. The principal banding data used were those in the files of the U. S. Fish and Wildlife Service for the years prior to 1940. Most Robins spend December, January, and February between latitudes 30° N. and 35° N. Recoveries indicate that northern Robins migrate to spend their winters in the same latitudes as Robins that breed in the southern portion of the range of the species. Eastern Robins tend to winter farther east than Robins that breed in the more westerly areas, but considerable overlap is shown. Robins that breed in the wintering latitudes usually migrate very little, if at all.—L. R. Mewaldt.

8. Effect of Weather on Spring Bird Migration in Northern Alabama. Thomas A. Imhof. 1953. *The Wilson Bulletin*, **65**(3): 184-195. Birmingham, Alabama, about 220 miles north of the Gulf of Mexico, is thought to lie barely within the northern edge of the "coastal hiatus" of the north Gulf coast. Between 1 March and 1 June of 1947 to 1950, some 130 field trips yielded 227 records of 28 night-migrating land birds that winter south of the United States and that breed east of the Mississippi River, but not in the immediate vicinity of Birmingham. These "true transients" were found in all types of weather, but especially after being grounded by a cold front. They were seldom encountered during clear, warm weather.—L. R. Mewaldt.

9. Effects of Weather on Nocturnal Migration as Seen from One Observation Point at Philadelphia. Joseph M. Devlin. 1954. *The Wilson Bulletin*, **66**(2): 93-101. From 14 March to 5 June 1953 approximately 115 hours were spent making daily morning and evening checks of migrants in a 5-acre Botany Garden in the midst of West Philadelphia, Pennsylvania. Of 468 noc-

turnal migrants of 59 species identified, 310 arrived on southerly winds, 141 arrived on "calm" nights, and 17 arrived on northerly winds. Of the 30 nights when the wind was southerly, migration occurred on 25; on 4 of the remaining 5 nights, heavy rains fell. Migration occurred on all 9 nights classified as "calm" (wind less than 0.5 m.p.h.). No evidence of migration was detected on 30 of the 32 nights when northerly winds were recorded. Evidence suggests that if night migrants have already acquired the urge to migrate, the hour just before nightfall is critical. If at that hour winds are calm or southerly, migration can be expected. Unfavorable conditions for migration (fog, rain, or northerly wind) at dusk prevent migration. It was found that day to day predicting of migration was as safe, at least, as forecasting the weather.—L. R. Mewaldt.

10. Meteorological Analysis of Occurrence of Grounded Migrants at Smith Point, Texas, April 17-May 17, 1951. John V. Dennis. 1954. *The Wilson Bulletin*, **66**(2): 102-111. Daily census counts were made of migrants (52 species) in a woody thicket about 50 feet wide and ¾-mile long on a projection of land in Galveston Bay. Counts of migrants increased sharply on the day following the arrival of each of five cold fronts. Another increase in numbers was apparently associated with a westerly wind unfavorable to migration. Grounded migrants departed with the arrival of southerly winds, rising temperature, and falling barometric pressure.—L. R. Mewaldt.

11. The flight of spring migrants at Malmö in 1949 and 1950. (Om flyttfåglarnas i Malmö åren 1949 och 1950.) Staffan Ulfstrand. 1952. *Vår Fågelvärld*, **11**(1): 16-23. The density of arrivals of *Phylloscopus trochilus* and apparently several other passerine species in April and May, 1949, showed a fairly close correlation with morning temperatures. Similarly there was a correlation in May 1950 between minimum nightly temperatures and arrival of *Phylloscopus trochilus*. During this season species migrating from the southeast arrived unusually early whereas those from the southwest arrived late. This is correlated with unseasonably warm weather in southeastern Europe and extremely cold weather in western Europe.—D. S. Farner.

12. Ornithological Observation from Utsira, 1950. Holger Holgerson. 1952. *Stavanger Museum Opuscula Series Zoologica* Nr. 6. 20 pp. This is a record of observations, many of them on migration, made by several individuals during September-October 1949. In a discussion the author makes the cogent observation that undue attention to particular islands in studying migration may lead to invalid concepts of migration on a restricted front. Examples are cited.—D. S. Farner.

13. Ornithological Observations from Lista, 1951. John H. Hyatt and Christopher K. Mylne. 1952. *Stavanger Museum Opuscula Series Zoologica* Nr. 7, 45 pp. A party of five made observations with respect to visible migration during the period 12 September to 2 October 1951. Included are data obtained at the lighthouse at night. Among the interesting results of these observations were the appearance of several rare eastern species during 23-28 September, a period of steady east wind and the development of intense migratory movements during 29 September-1 October with rising barometric pressure and no wind. Since this followed a period of easterly winds it is suggested that these birds arrived by "drift" movements from the Baltic area. It is to be hoped that these observations can be extended into subsequent seasons.—D. S. Farner.

POPULATION DYNAMICS

(See also Numbers 22, 23, 34, 36, 37, 57, 64)

14. Population Density Studies in Coniferous Forests (Untersuchungen zur Siedlungsdichte der Vogelwelt in den Harzwaldungen.) W. Lehmann. 1953. *Ornithologische Mitteilungen*, **5**(9): 161-163. The presence of managed forests in Europe with uniform stands of trees of one age and species affords an opportunity for unusual population density studies. This paper describes the results

of one such study. A tract of 150-year old beech forest which occupies land just below the altitude of the conifers had only 0.5 pair of birds per hectare while a 25-year old stand 4-5 m. in height had a density of 1.1 pr./ha. Much higher densities have been reported from deciduous forests of the lowlands of northwest Germany.

The introduction of conifers increased the population density so that a mixed forest of 150-200-year old trees had a density of 0.8 pr./ha. In uniform coniferous forests the density was somewhat higher; 1 pr./ha. As all trunks containing cavities were removed from these managed forests, hole-nesting birds were absent, accounting in part for the low densities. The Chaffinch was the most abundant species in all types of forest. The methods employed in obtaining these figures is not stated.—R. O. Bender.

15. Swans in Sweden on 25 March 1951. (Svanarna i Sverige den 25 mars 1951.) Nils Linnman. 1952. *Vår Fågelvärld,* **11**(1): 1-10. Coöperation in a census of Swedish swans was solicited through the Swedish radio; 9,365 individuals, *Cygnus olor* and *Cygnus cygnus* (possible also, a few *Cygnus columbianus bewickii)* were reported.—D. S. Farner.

16. Quantitative Variations in the Populations of Birds in a Tropical Area. (Variazioni quantitative in popolazioni di uccelli di un' area tropicale.) Augosto Toschi. 1952. *Supplemento alle Richerche di Zoologia Applicata alla Caccio,* **2**(6): 181-237. The study area contained about 30,000 hectares of park about the Coryndon Museum and adjacent fields in Nairobi; the area is bisected by the Nairobi River. Census methods of Linsdale and Winterbottom were employed. Data were obtained from November 1943 through February 1946. Eight stations were established at selected locations. Routinely (almost daily) counts were made for 2-minute periods at each station; in addition a daily list was maintained. Compilations and analyses of both types of data are presented. The relative abundances of species as calculated from the two sets of data are essentially similar. Correlations are made with season, weather, palearctic migration, and other factors. There is also an annotated list of all species observed.—D. S. Farner.

17. New techniques for the analysis of absenteeism data. A. G. Arbous and H. S. Sichel. 1954. *Biometrika* **41**(1/2): 77-90, folding table. 2 Fig.—The methods of this paper may be applied to the question of whether a bird tends to avoid a trap after being once or more often trapped. By appropriate shifting of traps it would also be possible to say whether the avoidance is primarily a matter of trap type or of location. It is further possible to examine whether some individuals are more likely than others to avoid traps, that is are absence-prone.

Two models are set up. One gives the probability of finding an individual in the group having x absences in the same known exposure period. Throughout, an absence is a "period (of any length) of unbroken non-attendance." The second model employs two equilong, non-overlapping periods of exposure and is used to study absence-proneness. The authors recognize the need of keeping conditions of exposure constant and that individuals learn and adapt themselves in the course of time. The way is now open for some elegant and realistic work on the effects of trapping on the action of birds.—C. H. Blake.

18. A confidence interval for a percentage increase. Irwin Bross. 1954. *Biometrics* **10**(2): 245-250. The problem is to determine whether a percentage increase resulting from change of conditions is significant. The author recommends Mainland's (in *Elementary Medical Statistics)* tables of binomial confidence limits or the normal approximations for the 95% limit. The degree of confidence is dependent on sample and subsample sizes.—C. H. Blake.

NIDIFICATION AND REPRODUCTION
(See also Numbers 28, 29, 31, 43, 56, 57, 65)

19. The Breeding Biology of Hammond's Flycatcher. David E. Davis. 1954. *The Auk*, **71**(2): 164-171. The breeding biology of *Empidonax hammondi* as observed at Flathead Lake, Montana is reported in some detail, covering such points as voice, territory, the nest, and general behavior. The species inhabits moderately tall, dense, mixed vegetation. A "position note" and "alarm call" were recorded for both sexes; the male also has a "flight song." Territories are maintained. The nest is usually built about 30 feet from the ground and is constructed primarily by the female. The female alone incubates the clutch which usually consists of 3 eggs. Both adults feed the young. Comparisons with *E. wrightii, E. minimus, E. traillii, E. flaviventris, E. virescens, E. difficilis,* and *E. fulvifrons* indicate much similarity in breeding ecology, but great differences in habitat preference.—J. C. Dickinson, Jr.

20. Criteria of Age of Incubated Mallard, Wood Duck, and Bob-white Quail Eggs. Harold C. Hanson. 1954. *The Auk*, **71**(3): 267-272. This paper, which is a continuation of another report published elsewhere *(Journ. Wildl. Mgt., 18:* in press), provides photographs and notes on the developmental stages of three species: *Anas platyrhynchos, Aix sponsa* and *Colinus virginianus.* The information presented should allow the determination of age in incubated eggs. The techniques of observation and details of special equipment needed are presented in the paper now in press.—J. C. Dickinson, Jr.

21. Hybridization between the Bob-White and Scaled Quail. Robert A. McCabe. 1954. *The Auk*, **71**(3): 293-297. The records of a cross between a captive female *Callipepla squamata* and a male *Colinus virginianus* are presented. Six eggs were produced; all were hatched and reared to maturity; all were females, and unfortunately all of them died before any further crosses could be made. The ranges of the two species overlap slightly in Texas, where a single male specimen has been taken. The respective sexes of this wild-caught bird's parents are not known. Comparison of two of the captive-reared hybrids and the wild bird with typical representatives of the parent stocks shows a general blending of color characters; the dimorphic pattern of *Colinus* is evident in the male hybrid.—J. C. Dickinson, Jr.

22. A History of Some Bald Eagle Nest Sites in East-Central Florida. Joseph C. Howell. 1954. *The Auk*, **71**(3): 306-309. At 5-6 year intervals from 1935 to 1951, 24 Bald Eagle *(Haliaeetus leucocephalus)* nests in Brevard and Volusia counties, Florida, were checked for occupancy. Percentages of occupancy for the 24 nests are reported as follows: 1935 (83%), 1940 (46%), 1946 (54%), 1951 (58%). Howell does not discuss the possibility of bias in the selection of the 1935 sample although he comments ". . . what in one instance had been considered two pairs was in reality only one; and two pairs included in earlier calculations have been omitted because their histories are incomplete and two pairs with complete histories have been used instead." My calculations of percent occupancy, based on Howell's data, show 41% to be the correct figure for 1940 when 11 of 24 nests were occupied. In 1951 two new nests were found, and air search revealed occupancy of two nests reported as not occupied on the basis of ground search. Howell concludes the data probably indicate that the group of nest sites was occupied in 1951 by 70-90 percent of the pairs occupying these sites in 1935.—J. C. Dickinson, Jr.

23. Census of Swallows in the Sedbergh Area, N.W. Yorkshire, in 1953. E. I. Cuthbertson, G. T. Foggitt and G. E. Taylor. 1954. *British Birds*, **47**(6): 204-205. In 106 nests of *Hirundo rustica* 468 eggs were laid, 399 of these hatched and 386 were fledged, 82.5 percent of success.—M. M. Nice.

24. Experimental Ending of Incubation and other Observations on Breeding Behavior with the Herring Gull. (Experimentelle Brutbeendigung und andere brutethologische Betrachtungen bei Silbermöven *(Larus a. argentatus*

Pontopp.) Friedrich Goethe. 1953. *Journal für Ornithologie*, **94**(1/2): 160-174. Pipped eggs with calling chicks were given to Herring Gull pairs at the beginning, middle and end of incubation; a prompt change-over to the phase of care of the young took place in each case but one, where an apparently inexperienced pair had not yet finished their clutch. While the blinds were being erected the males took the major part of nest duties, but while the young were hatching the females did so. In one nest a 6-hour chick had moved 5 centimeters out of the nest, a 24-hour chick a meter.—M. M. Nice.

LIFE HISTORY
(See also Number 65)

25. Biology of the Chiffchaff. (Beitrag zur Biologie des Zilpzalps, Phylloscopus collybita [L.]. Werner Geissbuhler. 1954. *Ornithologische Beobachter* **51**(3): 71-99. Students of nesting biology should profit from this paper, which shows how valuable banding techniques can be in investigating the life history of a single species. The study, although of a species already thoroughly treated, (the bibliography numbers 45 titles) is exceedingly complete. The author presents data clearing up two uncertainties in the biology of the Chiffchaff: he shows that second nestings do occur following successful first nestings, and that the male assists in the care of the young, although his contribution is too small to have biological importance.—R. O. Bender.

BEHAVIOR
(See also Numbers 6, 19, 24, 56, 58, 62, 63, 65)

26. Development of Vocalizations in Whitethroats Kept from the Egg in Sound-proof Chambers in Comparison with Others Isolated Later and with Wild Birds. (Die Entwicklung der Lautäusserungen vom Ei ab schalldicht gehaltener Dorngrasmücken *(Sylvia c. communis*, Latham) im Vergleich mit später isolierten und mit wildlebenden Artgenossen.) Franz Sauer. 1954. *Zeitschrift für Tierpsychologie*, **11**(1): 10-93. This remarkable study is based first on a thorough knowledge of the species in the wild, and second, on seven individuals, four males and one female isolated soon after hatching and two males raised in isolation from the egg. The Whitethroat's song is described in "The Handbook of British Birds" (Witherby et al, 1938) as a "short, rapidly uttered warble, brisk and lively, of rather poor quality, though some more musical than others." The 25 call notes and all 3 types of song proved completely innate. The difficult technique of raising the young from the egg is described, and valuable observations are given on growth and the development of behavior. Vocalizations were recorded on tape, the song being transposed onto the musical scale. The song first appears as a reiteration of the same note. "Gradually a growing number of single innate notes make their appearance and are integrated within the first month of the bird's life to the juvenile song. The above mentioned single notes maturated synchronously in the two males absolutely isolated as eggs, as typically and in the same times as in wild living whitethroats." The third male started at 38 days with a song at the same stage as that of the others. "So, the whole process of maturation can take place latently."

The last three sentences of the English summary are applicable to many species besides the Whitethroat: "Juvenile song as well as autumn and winter song are considered as 'play,' as they are uttered without a function for their own sake; they represent the highest differentiation of the species' song. Territorial song which develops a definite function in reproduction, originates by simplification and reduction of the juvenile song. All notes or groups of notes uttered in territorial song are present in and derived from juvenile song."—M. M. Nice.

27. On the Innate Behavior of Birds, especially Chickens. (Ueber angeborene Verhaltensweisen bei Vögeln, inbesondere bei Hühnerkücken.) Annette Curtius geb. Roth. 1954. *Zeitschrift für Tierpsychologie*, **11**(1): 94-109. Large-scale experiments on the characters important in food recognition were

carried out on 1624 chickens, 86 Lapwings, *Vanellus vanellus*, and 30 turkeys. Each species preferred the size best suited to the size of its beak: turkeys to objects 5 mm. in diameter, chickens 2.5, Lapwings 1 mm. Colored models on white, black or grey backgrounds were chosen according to the contrast of brightness between the model and background, but when grey was placed on grey, the chicks preferred the weaker contrast.—M. M. Nice.

28. Notes on the Winter Roosting and Behaviour of a Pair of Nuthatches. M. C. Radford. 1954. *British Birds*, **47**(5): 166-168. A chart gives the times of roosting and rising of a female *Sitta europea* from October 15 to March 22. The time of leaving the box followed the course of sunrise closely with a tendency for later rising on dark and foggy mornings. Roosting was more variable; sometimes the bird roosted early on dark afternoons, at other times not. In severe cold she roosted later, probably because of difficulty in obtaining food. Courtship feeding was first seen January 31, nest-building started March 22 and five young were fledged May 28.—M. M. Nice.

29. Experiments with an Artificial Nestling. Monica M. Betts. 1954. *British Birds*, **47**(7): 229-231. In order to obtain samples of food brought to 12-day-old Pied Flycatchers, *Muscicapa hypoleuca*, the author constructed an artificial gape out of a black rubber pipette-bulb cut like a beak and lined with yellow balloon-rubber smeared with red paint. "A pair of forceps is used as mounting for this in such a way that one of the points, also covered with yellow rubber, makes a tongue while the other is attached to the part forming the upper mandible so that when the forceps are closed the food is firmly grasped." Photographs show details of the apparatus and 2 views of the interior of the nest, in one of which the male is feeding the artificial nestling, which from the back view looks more like a snake than a baby bird, clearly showing how powerful is the instinctive drive to feed whatever gapes in the nest. As to the color of the gape, when I have exchanged nestlings I never found one with a red gape slighted in a nest where the hosts had yellow gapes nor vice versa.—M. M. Nice.

30. Factors Governing the Changes in Strength of a Partially Inborn Response, as Shown by the Mobbing Behaviour of the Chaffinch *(Fringilla coelebs)*. I. The nature of the response, and an examination of its course. II. The waning of the response. R. A. Hinde. 1954. *Proceedings of the Royal Society*, B. 142: 306-331; 331-358. Well-planned experiments on a large number of captive Chaffinches with live and mounted owls and other objects. The *chink* call was used as an index of the intensity of the response. In Part I comparisons of mobbing movements are made with 13 other Fringillidae. Roles of approaching and fleeing tendencies are analyzed; an investigatory tendency is also present. Recognition of owls as enemies and the motor pattern of response are inborn, but they do not mature until the bird is about a month old. In Part II the process of habituation is analyzed. Two processes appear to be involved, one "specific to the response and subject to rapid recovery," the other specific to the stimulus and producing long-term effects.—M. M. Nice.

31. A Study of the Display of the Ruff *(Philomachus pugnax (L.))*. P. Banke and H. Messenburg. 1952. *Dansk Ornithologisk Forenings Tidsskrift*, **46**(3): 98-109. Minute by minute observations from 0210 to 1635, June 5, 1950 in the Tipperne Sanctuary on a group of six Ruff "owners," three "whites" (Ruffs with white collars), "guests" (other visiting Ruffs), and several Reeves. The owners, one of which had been banded in 1947, another in 1948, stayed on the "hill" until about 8 o'clock; from then until noon they foraged nearby, and spent the afternoon and evening on their "hill." Each owner had his private display territory, but all protected the "hill" from visiting males, except from the whites which were not molested. Twice Reeves were seen trying to copulate with other Reeves.—M. M. Nice.

32. Swimming Movements of Diving Ducks. (Die Schwimmbewegungen der Tauchenten (Gatt. Aythya).) Zdeněk Veselovský. 1952. *Acta Societatis Zoologicae Bohemoslovenicae*, **16**(3-4): 354-376. Careful analysis of swimming

movements with 24 photographs and 4 series of sketches from moving pictures. Ducks of the genus *Anas* have a specific gravity of about 0.6, those of *Aythya* 0.8. Observations are given on the length of dives and intervals between them of a Tufted Duck, *Aythya fuligula*.—M. M. Nice.

33. Further Contribution to the Question of Swifts Spending the Night in the Air. (Weiterer Beitrag zur Frage des Nächtigens beim Mauersegler, Apus apus [L.].) Emil Weitnauer. 1954. *Der Ornithologische Beobachter* **51**(3): 66-71. Supplementing his first study (see *Bird-Banding* **25**(3): 122) the author presents data to show that during nesting season the non-breeding birds, mostly 1 year old, are the ones which spend the night in the air. This behavior is subject to weather and does not occur during rain; this is confirmed by a chart. Later in the season when the young are almost ready to leave the nest some of the breeding adults, mostly males, also share in this behavior. Several attempts to confirm the presence of Swifts in the air at night from an airplane failed because weather conditions prevented satisfactory observations.—R. O. Bender.

WILDLIFE MANAGEMENT

(See also Numbers 21, 38, 39, 40, 41, 57, 59, 61, 64)

34. Estimating the Percentage Kill in Ringnecked Pheasants and Other Game Species. George A. Petrides. 1954. *Journal of Wildlife Management*, **18**(3): 294-297. To appraise the effectiveness of harvest regulations, knowledge of the percentage of population mortality attributable to hunting is essential. Formulae for determining the percentage harvest of males alone or of each sex (where both sexes are hunted), based on pre- and post-season sex ratios, are presented. The total number of birds harvested is not required. For seasons involving harvests of males only, the percentage killed can be determined from a table included in the article.—Helmut K. Buechner.

35. Further Studies of Bob-White Mobility in Central Missouri. John B. Lewis. 1954. *Journal of Wildlife Management*, **18**(3): 414-416. Data were obtained by trapping and banding 300 Bobwhite Quail *(Colinus virginianus)*, 145 of which were trapped a total of 596 times. Of the 27 marked birds observed from June 1 to August 1, 1951, 18 birds remained within ¼ mile of the place of banding, 6 travelled from ¼ to ½ mile, 2 moved from ½ to ¾ mile, and 1 moved over ¾ but less than 1 mile, supporting previous eivdence of low summer mobility. Greatly increased movement during the so-called fall shuffle was not observed. Dispersal of over one-half mile from the trap site was 15 percent greater in the spring than during the summer. One banded bird was shot 12 miles from the last trap site. It is suggested that units larger than individual Missouri farms, which are often less than one-half mile in greatest dimension, be managed for effective production.—Helmut K. Buechner.

36. Game Farm Pheasant Returns to the Hunters' Bag, Weber County, Utah, 1946-1951. Jessop B. Low. 1954. *Journal of Wildlife Management*, **18**(3): 419-423. Of 764 game-farm pheasants *(Phasianus colchicus)* released during a six-year period, 211 birds (28 percent) are known to have been harvested. The highest return was 46 percent in 1947; the lowest 15 percent in 1946. Birds released up to 4 weeks prior to the opening date of the hunting season gave 40 to 60 percent returns, while less than 30 percent of those released longer than 4 weeks were returned. Banded birds averaged slightly over 18 percent and wild birds about 81 percent of the total harvest.—Helmut K. Buechner.

CONSERVATION

37. Problems of Controlled Sea Bird Protection. (Probleme des Gelenkten Seevogelschutzes.) Rudolf Drost. 1954. *Ornithologische Mitteilungen* **6**(6/7): 112-119. This is a very interesting discussion of the problem of maintaining a balance in the protection of sea bird colonies. When gulls and other aggressive

forms are protected, their resulting increase may diminish the populations of other species. The principal conclusion is that protective measures must be instituted for large areas on a scientific basis rather than for local areas on an emotional basis.—R. O. Bendér.

38. Scientific Foundations for the Protection of the Swallow. (Die wissenschaftlichen Grundlagen des Schutzes der Rauchschwalbe [Hirundo rustica].) Arnold Frhr V. Vietinghoff-Riesch. 1954. *Ornithologische Mitteilungen* **6**(6/7): 105-112. After an historical review of the public attitude toward the protection of swallows and its effect on population densities in various parts of Europe, the author discusses various factors to be investigated in an effort to place their protection on a sounder basis. The measures proposed do not have much significance for North American populations.—R. O. Bender.

PARASITES AND DISEASES

39. The Effect of Lead Poisoning on the Fertility and Fecundity of Domestic Mallard Ducks. William H. Elder. 1954. *Journal of Wildlife Management*, **18**(3): 315-323. Domestic mallard ducks treated with dosages of 6 and 18 lead shot showed no significant loss in weight or erythrocytes, but the percentage of eggs found infertile was slightly greater among the birds with the higher dosage. When both sexes suffered from the high level of lead poisoning, twice as many eggs were infertile. In a second experiment, 18 lead shot did not produce significantly higher early embryonic (less than 4 days of incubation) mortality; however, groups in which either male or female suffered from lead poisoning showed a significantly greater percentage of late embryonic deaths (5-24 days of incubation) than did the controls. During the April-May period, normal hens exceeded leaded hens by 11 eggs in 1948 and 7 eggs in 1949, suggesting that lead poisoning in late winter or early spring may have a real effect on fecundity. The data are not considered conclusive, and whether the effect is sufficiently great to produce productivity of wild female ducks is still uncertain. —Helmut K. Buechner.

40. A Technique for Bleeding Nestling Birds by Cardiac Puncture for Viral Studies. Clarence A. Sooter. 1954. *Journal of Wildlife Management*, **18**(3): 409-410. During investigations to determine natural reservoirs for equine encephalomyelitis, blood samples were taken by the method described from 3,401 nestlings in 1,290 broods with an estimated sampling mortality of about 2 percent. Some birds were bled as many as four times. In Mourning Doves and pigeons it was necessary to extract blood from the brachial vein in the wing. All other species were sampled by cardiac puncture.—Helmut K. Beuchner.

41. Avian Malaria in Relation to Survival and Growth of a Group of Young Gambel's Quail in Captivity. Howard Campbell. 1954. *Journal of Wildlife Management*, **18**(3): 416-418. Observations on 12 Gambel Quail *(Lophortyx gambelii gambelii)* raised from 3-5 weeks of age to maturity showed that two malarial organisms, *Haemoproteus lophorytx* O'Roke and *Plasmodium* sp., had a negligible effect on survival and growth.—Helmut K. Beuchner.

42. The Fair Isle Apparatus for Collecting Bird Ecto-Parasites. Kenneth Williamson. 1954. *British Birds*, **47**(7): 234-235. Description and photograph of apparatus for collecting ecto-parasites by chloroforming them.—M. M. Nice.

43. Protocalliphora in Birds' Nests. D. F. Owen. 1954. *British Birds*, **47**(7): 236-243. A summary of European and some American records of infestation with these flies whose larvae are parasitic on nestlings. As the parasites depend on living birds, it is probable that the hosts do not often die unless other unfavorable factors play a part.—M. M. Nice.

PHYSIOLOGY AND PSYCHOLOGY
(See also Numbers 6, 27, 30, 58, 62)

44. The Oil Gland of Birds. William H. Elder. 1954. *The Wilson Bulletin*, **66**(1): 6-31. The functions of the uropygial or oil gland of birds are generally little known. This paper brings together and evaluates the scattered literature and reports the results from experiments on three species of Anatidae. The act of preening induces secretion of a substance containing much fatty acid plus some fat and wax, which is transferred to the body plumage by the bill and the head plumage. The secreted substance is essential for maintenance of feather structure from one molt to the next, especially in ducks, and is apparently important in maintaining bill and leg surfaces. Redhead *(Aythya americana)* ducklings from which uropygial glands had been removed displayed the same preening behavior as unoperated controls, but the glandless birds tended to avoid water. Although the uropygial gland is not considered essential for growth and development, its absence in captive Mallards *(Anas platyrhynchos)* and Redheads impaired their growth. The author suggests that the differential growth rates may be attributed to the more efficient insulating layer provided by the properly preened feathers of normal birds. The uropygial gland does not appear essential for the maintenance of life of ducks in captivity, but is most likely imperative for survival in the wild.—L. R. Mewaldt.

MORPHOLOGY AND ANATOMY
(See also Number 46)

45. Variation in a Flock of the European Starling. LeRoy C. Stegman. 1954. *The Auk*, **71**(2): 179-185. In careful study of variation in a series of 455 specimens of *Sturnus vulgaris*, 280 males and 215 females collected during a single evening, the author made precise measurements of total length, tail, wing, head, cranial width, bill, and recorded total weights of brain, gizzard, heart, liver, lungs and gonads. Statistical analysis of these data shows the males to be significantly consistently larger than females in all characters investigated, but in no case is the dimorphism of sufficient magnitude to allow accurate determination of sex. An overlap of 78 percent precludes the use of external measurements for sex determination in the field.—J. C. Dickinson, Jr.

PLUMAGES AND MOLTS

46. Postembryonic Development of Our Wild Ducks. (Postembryonale Entwicklung unserer Wildenten. Two page German summary of Czechoslovakian article.) Zdeněk Veselovský. *Sylvia*, **14**: 36-73. Weights and measurements of 24 diving ducks of three species and 13 river ducks of three species are given from hatching to maturity. The surface of the webs is markedly larger in the diving than in the river ducks. The straining movements of the bill are analyzed; the lamellae on the edge of the bill first appeared at 6-7 days in all the ducklings. The Shoveller's, *Spatula clypeata*, bill is no larger to begin with than in other ducklings, but starts to grow fast at 6 days and still increases in length and breadth after flight is attained. Growth of feathers was recorded in all species. Contour feathers first appeared in the Teal, *Anas crecca*, at 16 days, in the Shoveller and Mallard, *A. platyrhynchos*, at 17, in the Gadwall, *A. strepera*, at 20, in the Pochard, *Aythya ferina*, at 19 and in the Tufted Duck, *A. fuligula*, at 20 days. In the Teal the primaries appear on the 20th day and flight is attained at 36 days. Corresponding figures for other species are: Gadwall 25th and 59th days, Mallard 32nd and 60th days, Pochard 29th and 55th days, Tufted Duck 30th and 59th days. In all species the primaries grew about 5mm. a day. Eight pages are devoted to tables giving details on weight and on growth of bill, nail, tarsus, primaries, etc. by species and by sex. A valuable paper.—M. M. Nice.

47. Plumage Aberrations of the Redwing *(Agelaius phoeniceus)*. Robert W. Nero. 1954. *The Auk*, **71**(2): 137-155. Color aberrations in the plumage of 322 Redwings are reported in this detailed study, 219 of them collected in the

vicinity of Madison, Wisconsin, 90 obtained from various museum collections, and 13 taken from published descriptions. Total albinism (complete absence of melanin from the eyes, skin and feathers) was found in 6 females and 1 male possibly wrongly sexed. Imperfect albinism (dilution) was detected in 14 females and 2 males. Nero suggests that this is an indication of sex-linkage in that the hetrogametic sex allows its expression more frequently. His suggestion ignores differential sexual selection against the aberrant individual. Partial albinism affecting random areas (complete or partial inhibition of melanins within localized areas) was observed in 80 specimens; partial albinism of a restricted type was observed in 46 specimens. Practically all of the specimens collected at Madison showed some deviation from the wholly black plumage. Evidence is presented suggesting that red pigment normally occurs in the anterior regions of the male Redwing where it is masked by melanins. Brief comments on the behavior of two abnormally plumaged Redwings are included.—J. C. Dickinson, Jr.

48. The Tail Molt of Small Owls. Ernst Mayr and Margaret Mayr. 1954. *The Auk*, **71**(2): 172-178. Investigation of tail molt in owls of the genera *Speotyto*, *Athene*, *Glaucidium*, *Otus*, *Ninox*, *Tyto*, *Bubo*, and *Strix* show the type of molt apparently correlated with size of the species. Small species have a simultaneous molt of all, or nearly all, rectrices. Large species have a gradual molt of the "centrifugal" type, i.e., from the innermost feathers outward. Molt appears to be gradual in *Tyto*, *Bubo*, and *Strix*. It is simultaneous in *Otus*, *Glaucidium*, *Athene*, and *Speotyto*. It is simultaneous in the smaller species of *Ninox* and gradual in the larger forms. The authors discuss the possible reasons for simultaneous tail molt in the light of its probable selective significance.—J. C. Dickinson, Jr.

FAUNISTICS

(See also Numbers 7, 8, 22, 37, 65, 66)

49. Bird Records and the A.O.U. Check-List Ranges. E. M. Reilly, Jr. 1954. *The Auk*, **71**(2): 156-163. The author, who has been engaged since 1948 in preparing the ranges of North American birds for the new A.O.U. Check-List, discusses some of the difficulties he has encountered. These arise from three main causes: (1) the ranges of many species are not static, (2) the ranges are plotted from accumulated observations which are irregular in space and time, (3) many of the records, both sight and specimen, are not reliable. Reilly discounts the reality of the first two causes in that corrective measures are easily applied. The body of his discussion is taken up with well thought-out criticisms of published records of distribution.

Some of the principal causes of error are (1) faulty assessment of breeding or non-breeding status, (2) failure to retract sight misidentifications once they have been published, (3) compound errors resulting from faulty transcription of records, (4) eagerness to add new forms to published lists, particularly when a hypothetical list is appended, (5) lack of uniformity in using the relative terms common, rare, casual, accidental, etc., (6) use of trinomials on the basis of locality, (7) failure to collect the specimen, (8) faulty or inadequate locating of reported occurrences, (9) failure to indicate whether A.O.U. Check-List names are being used, (10) reluctance to document breeding status by collecting the nest.

The author's points are well taken; certainly careful attention to his recommendations by both professionals and amateurs would be of great benefit.—J. C. Dickinson, Jr.

50. Summer Birds of Western Ontario. L. L. Snyder. 1953. *Transactions of the Royal Canadian Institute*, **30**(1): 47-95. The Royal Ontario Museum of Zoology and Palaeontology has sent four summer expeditions to western Ontario, an area on which heretofore little information has been available. Combining the results of these expeditions with data from other sources, this paper lists for the region 170 species of summer birds (three hypothetically) of which 95 are known to have bred there. Concise annotations deal mainly with occurrence and distribution; a few notes on voice and behavior are added for some species.

Taxonomic examination of 739 specimens shows a considerable influence of campestrian elements and indicates several useful distributional cornerposts for species whose ranges center farther south. The author concludes that, "Obviously faunal influx or peripheral pressure is from the south and west."—W. Earl Godfrey.

51. Invasions of Leach's Petrel and of Storm Petrels in Central Europe in the Autumn of 1952. (Invasionen von Wellenläufern und Sturmschwalben in Mitteleuropa während des Herbstes 1952.) 1954. Friedrich Goethe. *Die Vogelwelt*, **75**(3): 89-100. These best documented invasions of Leach's Petrel *(Oceanodroma l. leucorrhoa)* and of Storm Petrels *(Hydrobates p. pelagicus* and *H. p. melitensis)* in historic times are tabulated, mapped, and dated. Waves of invasion are correlated with precise weather records. The question is raised whether or not New World individuals of Leach's Petrel may not have participated in this invasion. A taxonomic discussion is included.—Frances Hamerstrom.

52. The "Wreck" of Leach's Petrels in the Autumn of 1952. Hugh Boyd. 1954. *British Birds*, **47**(5): 137-163. A large-scale "wreck" of *Oceanodroma leucorrhoa* occurred in the British Isles between October 21 and November 8, 1952, the last such catastrophe having taken place in September and October 1891. The number found dead or dying in Great Britain in 1952 were 2,609, while estimates reached 6,700. The wreck took place at a time of widespread gales over the North Atlantic. "It is probable that the whole population of the species, not merely its small European component, was involved. If this was so, the effects of the 'wreck' may not be serious," p. 150 (as the loss would be spread over a considerable population). All the records are listed as well as the names of the 560 people who contributed information.—M. M. Nice.

53. The Thrush Nightingale in Dalsland. (Näktergalen *(Luscinia luscinia)* in Dalsland.) Nils-Gerhard Karvik. 1952. *Vår Fågelvärld*, **11**(2): 76-80. A series of records indicate that there has been a northward extension of the range of this species in eastern Sweden in recent years (1945-1951).—D. S. Farner.

54. The First Breeding Record of the Indian Ring Dove in Sweden. (Turkduvan *(Streptopelia decaocto)* svensk häckfågel.) Gunnar Strömberg. 1952. *Vår Fågelvärld*, **11**(4): 177-179. A report of two pairs breeding in southern Skåne in 1951. This is a further contribution to our knowledge of one of the most remarkable range expansions of an avian species.—D. S. Farner.

55. Notes on the Vertebrates of the Island of Montecristo. (Note sui vertebrati dell' Isola di Montecristo.) Augusto Toschi. 1953. *Richerche di Zoologia Applicata alla Caccia*, **23**: 1-55. The author visited this island for a week in the latter part of May 1953. Included in the annotated list are 46 species of birds. There is also a brief section which records observations on migration.—D. S. Farner.

FOOD HABITS
(See also Number 29)

56. The Starvation Theory in Albatrosses. L. E. Richdale. 1954. *The Auk*, **71**(3): 239-252. Careful observations of *Diomedea epomorpha sanfordi* at Taiaroa Head, Otago Peninsula, New Zealand, and of *D. e. epomorpha* on Campbell and Aukland Islands demonstrates the falsity of the starvation theory in the Royal Albatross. It was formerly held that the young birds were not fed for the last 4 months of nest life, and that during this period of forced fasting they lived on accumulated fat. It was further suggested that this was necessary to reduce the birds' weight enough to allow flight. The author confirms this loss of weight during the last months of nest life, but furnishes adequate evidence that the young birds are fed by the parents until they leave the nest.—J. C. Dickinson, Jr.

57. Possibilities and Limits of Bird Protection as a Natural Pest Control Measure in Fruit Culture. (Möglichkeiten und Grenzen des Vogelschutzes —als natürlichen Schädlingskampfung—im Obstbau), Hans Löhrl, 1954. *Orni-*

thologische Mitteilungen **6**(6/7): 126-129. After discussing the effect of various chemical pest control measures on bird populations and concluding that these have no effect (in Germany), the author examines the possible usefulness of birds in controlling insect pests. He concludes that in most situations they are insufficient and other measures should be used.

A study in which 500 nest boxes were placed in a hillside orchard covering 11.25 hectares showed that 162 pair of six species used the boxes in 1952 and 142 in 1953. Starlings were excluded. Thus there were 14.4 nesting pair per hectare in 1952 and 12.6 in 1953. The population density was higher in the lower part of the orchard where exposure to the sun was less, 20.7 pr./ha. in 1952 and 17.0 in 1953. There was no evidence of food shortage with this high density, but the fact that the undercover was grass which was mowed at about the time the larva of the Frost Moth (Frostspanner) began to pupate may have been a factor in the maintenance of an adequate food supply. In orchards where the grass is not mowed the food supply, particularly for Titmice, might become critical. He concludes that the determining factor for Titmouse populations is their ability to survive the winter which is the season of least adequate food supply.—R. O. Bender.

58. Studies on the Selective Choice of Food by Birds. (Untersuchungen über die selektive Nahrungswahl der Vögel.) Herbert Bruns. 1954. *Ornithologische Mitteilungen* **6**(6/7): 130-133. After a short, general review of previous work on the food of birds and on methods for studying it, the author discusses the various factors which could affect the birds' choice of food in the light of studies made principally on three species of Titmice confined in roomy cages. Factors treated are location (seeds on the edges of radially arranged series were chosen 20-30% more frequently than those in the middle), mass (larger masses preferred), size (larger preferred), form (variation according to species), brightness (lighter colored food preferred), color (no choice, further research needed), contrast (sharp black and white contrasted food shunned with preference given to solid black or white; yellow-black, yellow-blue, and red-black were also avoided), protective coloration (wild Marsh-Tits chose red or half red and half black seeds 142 times from a weak multicolored background and only 72 times from a single colored background).

Bruns considers the information available on the effects of smell, taste, and temperature is insufficient to justify any statement. He also discusses the possible effects of satiation, habit, and season. This stimulating paper should provide many ideas for research for the amateurs who operate feeding and banding stations.—R. O. Bender.

59. Is the Destruction of Potato Beetles by Birds Insignificant? (Ist die Vertilgung des Kartoffelkäfers durch Vögel bedeutunglos?) Karl Mansfield. 1954. *Ornithologische Mitteilungen* **6**(6/7): 134-137. After reviewing the literature which generally minimizes the importance of the destruction of potato beetles by birds the author reviews the available data by species. Most attention has been given to the Quail *(Coturnix coturnix)* and to the common hen. Experiments with chicken wagons (Hühnerwagen) in which the birds were transported to potato fields succeeded in destroying large numbers of beetles and larva, particularly in August and September.—R. O. Bender.

60. Birds as Destroyers of Plant Lice. (Vögel als Vertilger von Pflanzenlausen.) Robert Gerber. 1954. *Ornithologische Mitteilungen* **6**(6/7): 138-140. Literature records of European species of birds known to feed on plant lice. Nineteen references are given.—R. O. Bender.

61. Third Report on the Food of the Owls in Amrun. (Dritter Beitrag zur Ernährungsbiologie Amruner Eulen.) H. Kummerloeve and H. Remmert. 1954. *Ornithologische Mitteilungen* **6**(8): 165-170. This paper presents the results of an analysis of pellets of the Long-eared Owl *(Asio otus)* and the Short-eared Owl *(Asio flammeus)* collected on the island of Amrun. The data may be tabulated as follows:

	Asio otus	*Asio flammeus*
Apodemus silvaticus	1425	1468
Arvicola terrestris	154	155
Passer domesticus	75	—
Total Aves	203	207
Total Mammals	1587	1839

Sixteen beetles *(Geotrupes, Carabus)* and 30 mollusca *(Hydrobia, Mytelus)* were recovered from the Long-eared Owl pellets.—R. O. Bender.

SONG
(See also Number 26)

62. The Process of Song-Learning in the Chaffinch as Studied by Means of the Sound Spectrograph. W. H. Thorpe. 1954. *Nature*, 173: 465. Thorough, well-planned experiments on a large number of *Fringilla coelebs* showed that the normal song of three phrases "has a very restricted inborn basis amounting to little more than the ability to produce a song of about the normal length (2.3 sec.) and consisting of a *crescendo* series concluded by a single note of relatively high 'pitch.'" (With my hand-raised Song Sparrows the length and tripartite form of the song proved to be inborn, as well as the rate at which the songs were sung. The quality, however, was different.) Some learning of details of the song can take place in the first weeks of life, but the final form "is acquired during a period of high learning ability" in a few weeks in the bird's first spring. Eleven examples of songs are shown on the sound spectrograph.—M. M. Nice.

63. The Leier-Song of the Black-cap. (Der Leier-Uberschlag der Monchgrasmucke.) K. D. Morike. 1953. *Ornithologische Mitteilungen* **5**(5): 90-95. About 1920, reports of a variation of the normal song of the Black-cap *(Sylvia atricapilla)* began to be recorded from the Alps. This variation which became known as the "leier" song consists of the insertion of a series of notes in the regular song. This song form has now expanded over a much larger area at a rate which the author estimates to be about 5 km. per year. A few distant outposts have been recorded. There is some evidence that other Sylvidae may also sing the "Leier." This development is under close observation and further reports will be awaited with interest, particularly studies which might shed some light on the relative survival value of the two types of song.—R. O. Bender.

BOOKS

64. Our Wildlife Legacy. Durward L. Allen. 1954. Funk and Wagnalls, New York. x + 422 pp. $5.00. In recent years there has been great need for a new treatise in wildlife science to supplement Aldo Leopold's "Game Management" published in 1933 by Scribner's and Sons. Three attempts, one a two-volume work, have failed to fill the need. *Our Wildlife Legacy*, although written primarily for laymen, represents the most lucid, well-written, up-to-date account produced in the past two decades.

Allen's intent has been to present a wide range of relevant facts on terrestrial and aquatic wildlife in such a manner that responsible citizens can do their own thinking. In this objective he succeeds admirably. Principles permeate throughout the book, often under the guise of such attractive chapter titles or subheadings as: "They Grow in the Soil"—relations of nutrition to vigor and reproduction; "The One-Year Plan"—population mortality or turnover in short-lived birds; "So Many and No More"—carrying capacity and limiting factors; "Social Whirl"—territoriality; "Shuffling Things"—habitat improvement; "Boom or Bust"—population fluctuations; "Lead Kindly Light"—research.

To support the principles, an abundance of fact flows in rapid, easy-to-read style from Allen's pen. The excellent choice of significant facts bears witness to the alert mind through which the selection was accomplished. A unique system of documentation (by page and line) appears in a 36-page section of "Reference Notes" (based on 501 selected literature references), thereby freeing the text

from authority references that may annoy the lay reader. One is attracted on nearly every page by Allen's refreshing literary style. The book is divided into three parts, the first, "Numbers at Work," concerning population dynamics; the second, "Paths and By-Paths," dealing with management and mismanagement; and the third, "The Method and the Outlook," showing the path toward intelligent management based on research and freedom from politics.

Although written for the lay public rather than as a text, this book will serve perhaps better than any other now available as a first book to provide supplementary reading for lectures in elementary courses in wildlife conservation. It has depth, philosophy, and charm to encourage and excite the young student as well as a wealth of sound facts and ideas to formulate a lasting foundation.—Helmut K. Buechner.

65. The Yellow Wagtail. Stuart Smith. 1950. Collins. St. James Place, London. Distributed in the United States by John de Graff, Inc., 64 W. 23rd St., New York. xiv + 172 pages, 8 color and 4 black and white plates. $2.50. The author of this excellent life history study covers in minute and careful detail the bird and its breeding distribution, winter quarters and migrations, territory, pair-formation and aggressive display, nuptial display, nest, clutch, brood, and then delves into the historical origin of the name (*ca.* 1453), the background of nomenclature leading up to the present scientific name, *Motacilla flava flavissima*, and a general discussion of this palearctic genus. Appendices elaborate on the breeding distribution of the subject race in Europe and the various parts of the British Isles, and on the little known subject of parasites. The bibliography of 365 names, including a small amount of necessary repetition, refers conveniently to each chapter as an entity. A brief index coordinates salient features.

The thoroughness of this work precludes, in itself, any attempt to describe in a short review the vast amount of information presented. Unsolved is the puzzle of why the old cocks, migrating from Africa at a speed of 100 to 120 miles a day, precede the old hens which, in turn, arrive ahead of flocks of mixed adults. Lastly come the young of the year. Again why, after families have consolidated into flocks in the autumn and migrated, are the remaining stragglers always cocks or immatures, never hens?

Nest construction may require from 4 days to 3 weeks, depending largely on the weather and food supply. The hen does three quarters of the incubating of the clutch, which averages 5.2 eggs. The incubation period is 12 to 13 days. The fledglings leave the nest, which is customarily on the ground, after 11 to 13 days, but do not fly until the 16th day. Hatching success is 75.7 per cent, fledgling success 88 per cent, and total nesting success is thus 66 per cent. In the fifth year of observation the author finally recorded a second breeding following a successful first one.

Forty per cent of all the southbound birds return the following season, but only 25 per cent of the immatures.

The Yellow Wagtail group shows a wide range of individual variation within its 13 races (excluding a form considered probably a hybrid). Aberrants are numerous, even to the point of occurring as colonies, and may be due to hybridization with casual immigrants of another subspecies, or even to mutation in spite of the mathematical improbabilities, 1 in 5,000 at best, 1 in 1,000,000 normally. The genus is unstable from an evolutionary viewpoint and in need of further study.—Wendell Taber.

66. Birds of France. (Oiseaux de France.) 1954. No. 8. 16 pp. Association pour l'Etude dans la Nature des Oiseaux de France et leur Protection, 129 Blvd. St. Germain, Paris 6, France. 100 francs. Worthy of the professional's attention is Michael-Hervé Julien's article on the terrain and bird-life of the island of Ouessant, rising out of deep water some ten miles off the tip of Finisterre near Brest. Breeding species are few; the migratory pelagic and littoral forms are of great interest, and the terrestrial ones especially so. The lighthouse undoubtedly attracts many of the latter group. Here were taken the only two European specimens of Gray's Grasshopper Warbler, *Locustella fasciolata*, one on 26 September 1913, the other 17 September 1933; this eastern Siberian species normally migrates in autumn to the Philippines, the East Indies, and New Guinea.

J. de Brichambaut in discussing the subspecific distribution of Herring Gulls,

Larus argentatus michahellis in Mediterranean waters and *L. a. argentatus* nesting in British and French Atlantic waters, elaborates on the inexplicable peculiarity of the eyes, orange or reddish-orange in the British birds, yellow in birds of the nesting colony at Iles-Glenans in the Bay of Biscay.

For the novice there is a detailed comparative study with diagrams of wing and tail patterns of those gulls and terns most likely to be encountered in the field.

To encourage needed reforms, a lengthy exposition cites many recent cases of blatant disregard for the laws protecting birds, and the equally conspicuous lack of enforcement by the proper authorities.—Wendell Taber.

NOTES AND NEWS

We have been asked to find certain back issues of *Bird-Banding* for the Alexander Library at the Edward Grey Institute of Field Ornithology at Oxford: vol. 3, no. 1 (Jan. 1932), vol. 4, no. 1 (Jan. 1933), and vol. 5, no. 4 (Oct. 1934). This is one of the best ornithological libraries in Great Britain, and it is used intensively. It is hoped that some reader of *Bird-Banding* may be willing to give the library these issues, to complete their set; the issues can be sent to the editor, for forwarding. If anyone has these issues but prefers to sell them, please let the editor know, stating the price, but not forwarding the issues themselves at first.

At the annual meeting of the Northeastern Bird-Banding Association (at Barre, Mass., on October 2, 1954) the retirement of Mr. Richard M. Hinchman as Secretary-Treasurer was announced. He had served in that office for more than three years, carrying a heavy load of the business affairs of *Bird-Banding*, and setting a high standard in that office. By chance, it was at that same meeting that the Association voted a message of sympathy to the family of the late Charles B. Floyd, who died in the summer of 1954; Mr. Floyd had served as Treasurer of the Association at least since 1925 down to 1951; his devoted labors thus covered all five volumes of the old *Bulletin of the Northeastern Bird-Banding Association* and extended into the twenty-second volume of our present journal.

The inside back cover of this issue lists the new Secretary-Treasurer of the Association, Mr. Daniel P. Johnson, who is a Boy Scout executive on Cape Cod, and an active bander. Please direct to him all correspondence about dues, subscriptions, missing issues, back issues, and similar matters.

In this issue we show another Treasurer's report of the Association, feeling that it will be of general interest because the primary activity of the Association is the publication of this journal. It will be noted that the reserve for the publication of indices is now $1500; this reflects a transfer of $1136.50 from general funds, by vote taken at the annual meeting. Work is continuing on a ten-year index for the period 1941-50, though it is not yet possible to set a publication date.

NORTHEASTERN BIRD-BANDING ASSOCIATION

INCOME STATEMENT

	Year Ending Oct. 31	
	1953	*1954*
Receipts		
Subscriptions and dues (current year)	$2012.95	$2068.37
Sales of back issues and other items	85.72	119.68
Life membership payments	125.00	—
Contributions for index	100.00	—
Other contributions	229.51	300.00
Interest	1.88	11.85
	$2555.06	$2499.90
Expenses		
Printing of Bird-Banding	$1463.93	$1487.92
Purchases of back issues and other items	11.00	59.88
Other printing and stationery	95.25	—
Postage and clerical help	263.23	133.91
Expenses of annual meeting	25.50	28.50
Massachusetts Conservation Council (donation)	10.00	10.00
Bank charges and miscellaneous	6.81	10.93
	$1875.77	$1731.14
Transfer to life membership fund	125.00	—
Transfer to reserve for index	100.00	1136.50
	$2100.77	$2867.64
Accumulation of income for the year	454.29	(367.14)
Accumulated income at beginning of year	433.33	887.62
Accumulated income at end of year	$ 887.62	$ 519.88

BALANCE SHEET

	10/31/52	10/31/53	10/31/54
Assets			
Cash	$1644.91	$2192.58	$2877.71
Back issues of magazine	1.00	1.00	1.00
	$1645.91	$2193.58	$2878.71
Liabilities			
Accounts payable	$ 508.33	$ 368.11	$ 328.58
Subscriptions paid in advance	190.75	199.35	155.25
Reserve for index	263.50	363.50	1500.00
Life membership fund	250.00	375.00	375.00
Accumulated income	433.33	887.62	519.88
	$1645.91	$2193.58	$2878.71

Daniel P. Johnson,
Treasurer

BIRD-BANDING

A JOURNAL OF ORNITHOLOGICAL INVESTIGATION (Published Quarterly)

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Applications for membership in the Northeastern, Eastern and Inland Associations should be sent to their respective secretaries. The annual membership dues are $5.00 per year in the Northeastern Association, including a subscription to *Bird-Banding*. Membership in the Inland and Eastern Associations is $2.00 each per year; all members of those two associations who wish to receive *Bird-Banding* may send $4.00 direct to Mr. Johnson.

Publications for review should be sent to Mr. Austin (see address above).

Reprints of articles should be ordered early from the editor, preferably when manuscripts are submitted for publication. Current prices are as follows:

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75	6.50	9.00	12.00	14.50	3.25
100	7.75	9.50	13.00	15.50	3.50
150	8.50	10.25	13.75	16.75	4.00
200	9.00	10.75	14.75	18.00	4.25

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